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Bulletin No. 52 (Replacing Bul. No. 19) *March, 1949*

FACULTY OF AGRICULTURE
UNIVERSITY OF ALBERTA
Edmonton, Alberta, Canada

Sheep Production in Alberta

BY

DEPARTMENT OF ANIMAL SCIENCE

Distributed by
Department of Extension, University of Alberta
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Sheep Production in Alberta

BY

J. E. BOWSTEAD

INTRODUCTION

During World War II the sheep population in Canada rose rapidly until 1944 when it was estimated that there were 3,726,000 sheep in Canada. Since then the number of sheep has decreased rapidly. In 1948 it was estimated that there were only 2,251,000 sheep in this country. The decrease in the sheep population is not confined to Canada, as most of the world's important sheep raising countries have reported large decreases in the population of this class of livestock.

In Alberta the same fluctuation in sheep population has taken place. In 1940 Alberta became the leading sheep producing province in Canada, and by 1944 the sheep population had risen to 1,023,000 head. Following this peak a decline set in until numbers were reduced to 448,600 in 1948.

Canada consumes about three or four times more wool than she produces. She therefore has to import large quantities of wool and woolen goods. On the other hand, the consumption of lamb and mutton in Canada is relatively low, being around 4.8 pounds per capita as compared to over 70 pounds for beef and from 50 to 60 pounds for pork. Prior to the last war the production of lamb and mutton was very slightly in excess of consumption and small amounts were exported. Considering the fact that the sheep population has now fallen to below pre-war levels it is doubtful if Canada will produce sufficient lamb and mutton to meet the demands of her increased population.

While lamb, mutton and wool prices during the war did not increase to the same degree as beef and pork, prices since the war have taken an upward turn and as a result sheep raising has become a more profitable enterprise. Most authorities forecast prosperity in the sheep raising business for quite a long period.

As a result of the favorable outlook for the sheep business it may be anticipated that we will experience another period of expansion in sheep production. Since opportunity for land settlement is more favorable in Western Canada than in the East it is likely that increases in sheep numbers will be relatively greater in the

west than in the east. It would seem that under western conditions opportunity for expansion in sheep numbers is greater in the areas where mixed farming prevails than under range conditions where production has become somewhat more stabilized.

With the establishment of new flocks the problem of suitable information regarding various phases of sheep production will arise. This bulletin is presented with the object of providing helpful suggestions for the beginner in the sheep business and for those who feel the need of guidance in connection with their methods of sheep husbandry.

The Place of Sheep On the Alberta Farm

The development of the sheep industry in Alberta is dependent upon two rather significant factors: first, the place they may occupy in any program associated with proper utilization of land, and secondly, the extent to which they are able to compete with other classes of livestock from the standpoint of producing farm revenue. There are areas in Alberta where conditions are favorable for sheep and that are not already fully stocked. This applies particularly to the south-eastern portion of the province including what is known as "special areas" that have reverted to the Crown.

Fig. 1.—Land unsuitable for cultivation can be profitably utilized by sheep.

Courtesy of Alberta Department of Agriculture.

Probably the greatest opportunity for expansion in the sheep business in Alberta, however, is in connection with the establishment of small farm flocks, not only in the recognized mixed farming districts, but also in those sections where wheat growing has been the major farm enterprise.

In addition to the fact that natural conditions of soil and climate are favorable to sheep raising in most districts in Alberta, there are additional reasons why sheep should have a place on more of the small farms in the province. While it is true that the scavenging qualities of sheep may be over-emphasized, at the same time it must be recognized that as a means of utilizing the vegetation on waste places, summerfallow, and stubble fields, the sheep have an advantage over other classes of farm animals. The farm flock will graze the summerfallow before and after plowing, glean the stubble fields after harvesting as well as make possible a modified system of crop production; they will assist materially in controlling some of the more pernicious weeds and at the same time yield a substantial annual revenue. That the flock will return a tidy revenue and help to keep the farm clean is not a mere conjecture. One needs only to consider the enthusiasm of farmers who own flocks of varying sizes to appreciate that they constitute a vital part of the general farm scheme.

The farm flock produces an income from two sources, one from the sale of wool and another from the sale of lambs and culled ewes. During years of average feed and wool prices, the returns from the sale of wool are usually sufficient to cover a fair portion of the cost of feeding during the winter. Quick returns are secured in the case of marketable lambs, since these may be marketed within ten months after the ewes have been bred.

A large capital investment is not required in order to become established in the sheep business. More mature animals can be purchased with a given amount of money than is the case with other classes of live stock, and, next to swine, the increase in numbers is greater. This means that with a comparatively small initial outlay it is possible in a few years to establish a reasonably sized farm flock.

The introduction of sheep as part of the farm enterprise will necessarily mean the providing of proper facilities and equipment for handling this particular class of live stock. The one feature presenting any serious financial problem is that of fencing. The flock not properly fenced is likely to prove a nuisance on the farm and may easily be more or less of a worry to one's neighbors. Fencing with woven wire is the most satisfactory in well settled mixed farming areas. While the initial investment in a suitable

sheep fence may at first sight appear to be a rather serious question, at the same time when the cost of fencing is spread over the natural lifetime of a good fence, the situation is not so grave. In other words, the annual fencing charge against the flock is not sufficient to seriously affect the financial showing. While it may be necessary to construct permanent fences in order to pasture certain fields, a considerable reduction in fencing charges may be affected by the use of movable or temporary fences whenever possible. The use of temporary fences has the additional advantage of making it possible to utilize areas not otherwise available for sheep.

One of the greatest drawbacks concerned with sheep raising is the losses sustained from ravages of dogs and coyotes. Proper fencing helps to control losses in this connection, but the fact remains that both dogs and coyotes are taking altogether too large a toll from sheep flocks in Alberta each year. It may be necessary in order to prevent these losses to provide corrals well fenced with woven wire into which the sheep are penned during the night. In the interests of the sheep flocks in the province much more stringent laws should be enacted to provide greater protection to flock owners.

The shelter required for sheep need not be expensive. Dry, well ventilated quarters that will protect the flock from winter storms are the main features to be kept in mind in providing shelters. Observations made in connection with the sheep flock on the University Farm over a period of several years have shown that provided sheep are kept on high dry ground they will make little or no use of shelter, except during a stormy period, even though the temperature may drop considerably below zero. It is true, of course, that when the policy is followed of having ewes drop lambs during the winter some provision of warmer quarters may be necessary.

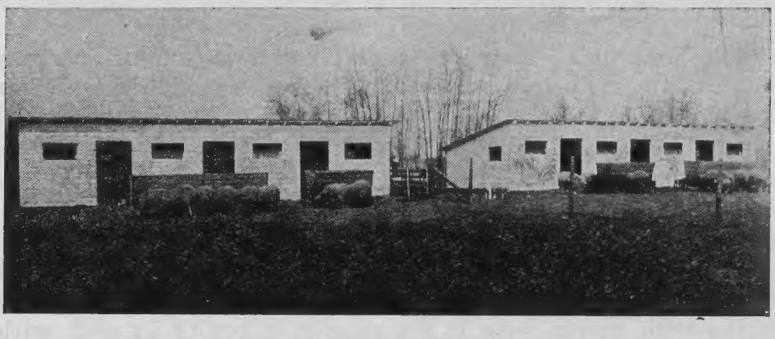


Fig. 2.—Sheep shelters need not be expensive.

While it is a fact that during most seasons of the year comparatively little attention need be given the flock, they do require close supervision at certain times. This is particularly true during the lambing season, and to a more or less extent at weaning and breeding times. During the lambing season complications and difficulties of various kinds may develop which must receive prompt and proper attention.

When the farmer possesses a natural aptitude for sheep, the greatest success in sheep raising will be obtained. Kindness, cleanliness, regularity and the ability to sense the needs of the flock are essentials. Greatest success and maximum profits are secured only when everything is done to promote the thrift and comfort of the flock. The individual who has a natural fondness for other classes of livestock may feel reasonably assured that he will readily acquire the ability to care for and handle sheep.

In the case of the farmer who has had little or no experience with sheep and who has only a limited capital, the suggestion would be to start with a small flock and develop the business as finances, experience and general conditions will warrant. It may be expected that there will be an increase in the number of sheep on Alberta farms, but this should come in the form of a substantial growth rather than as a speculative venture.

BREEDS OF SHEEP

Suffolk Down.

The Suffolk is one of the most popular breeds of sheep being raised in the farm flocks of western Canada. They are a fairly large, thick bodied, fleshy, fairly low set breed, and the meat is regarded as fine grained and of good quality. The Suffolk lambs grow rapidly and can be fattened for market at a weight well within the range to make choice carcasses.

The wool covering is not extensive, the head and legs from knee and hocks down are free from wool and sheep of this breed are inclined to be bare of wool on the belly. The hair is black. The wool is only medium in length, fair in compactness and quality, with fleeces weighing between 6 and 8 pounds, and grading medium to low medium staple. Black fibres in the wool constitute one of the major criticisms.

Suffolks are hardy, active and good travellers, which make them well adapted for Western Canadian conditions. They have been used extensively for crossbreeding in both farm and range flocks. Suffolk ewes make excellent mothers, being good milkers and produce a fairly large number of twins and triplets. Suffolk

Fig. 3.—A group of typical Suffolk rams bred by the University of Alberta.

rams weigh between 225 and 275 pounds, while many ewes reach 170 to 200 pounds when mature.

Hampshire Down.

This is one of the most popular breeds of sheep in Alberta. They are also fairly large in size, rams attaining a weight of 250 to 300 pounds, ewes reaching 175 pounds or more. Combined with reasonable weight, they are fairly low set, blocky and compact with good strength of bone. The fleece weight will average around 8 pounds and should grade medium to low medium staple. The wool covering extends well over the forehead and on to the cheeks. Greater extension of wool over the face is undesirable as it leads to snow blindness. The ear is quite large and varies from a dark brown to almost a black in color, and the same is true with the face and legs. While pink skins are desirable, blue skins are not uncommon. Some breeders believe that the black fibres in the wool are associated with the dark skin. Hampshire ewes are prolific and good milkers.

Hampshires and their crosses produce a satisfactory market lamb as they mature and finish at a desirable weight and yield a carcass well developed in the region of high priced cuts.

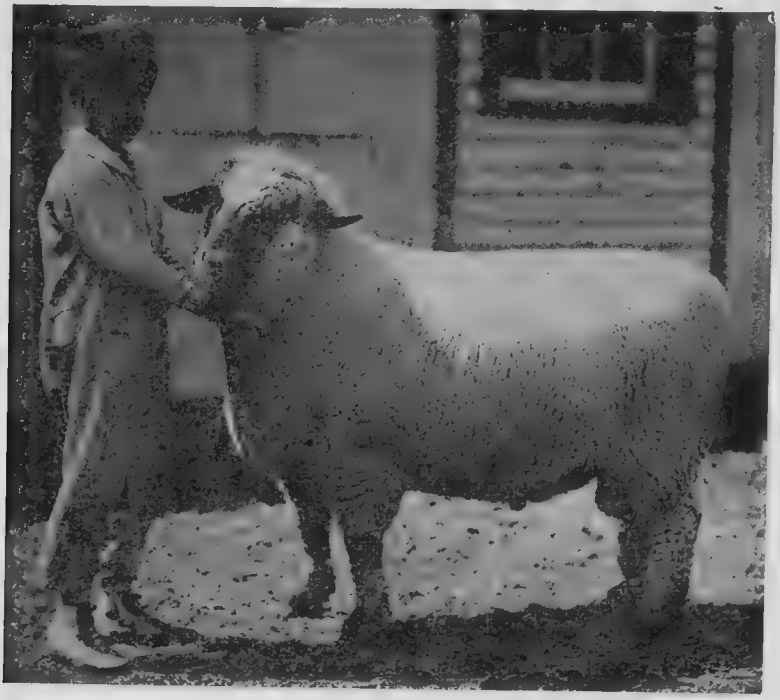


Fig. 4.—Hampshire ram, bred and owned by the University of Alberta. A show ram and sire of many prize winners.

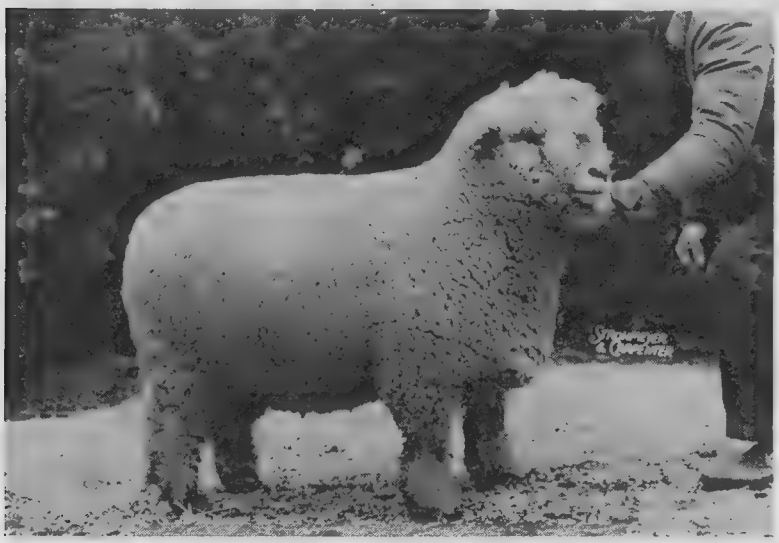


Fig. 5.—Champion Oxford ram at Royal Winter Fair, Toronto, 1948. Owner, T. H. Peacock, Crystal Beach, Ont.

Oxford Down.

The Oxford is the largest of the Down breeds, mature rams reaching a weight of 300 pounds and over, while ewes weigh around 200 pounds. Best specimens of the breed are reasonably low set and measure up fairly well from the standpoint of mutton type. On the other hand due to their greater weight together with a tendency to mature somewhat slowly, they do not produce as desirable a lamb either in weight or finish as some of the other Down breeds. Oxfords produce a fairly heavy fleece, from 3 to 4 inches in length, and usually grades low staple. The wool covering on the head comes down to a point in line with the eyes; the color of ears and face varies from a dark gray to a brown. Oxfords are prolific and good mothers. A number of good flocks of this particular breed are found in Alberta.

Southdowns.

A few Southdown flocks are found in Alberta. They are the smallest of the Down breeds, mature rams weighing 160 to 200 pounds, and the ewes 125 to 160 pounds. They are low-set, fine boned with a short neck and short, broad compact body, well turned and heavily fleshed throughout, especially in regions of the higher priced cuts. From a carcass standpoint the Southdown is an ideal mutton breed, possessing the ideal proportions and meat of finest texture. Wool extends well down the legs and over the cheeks

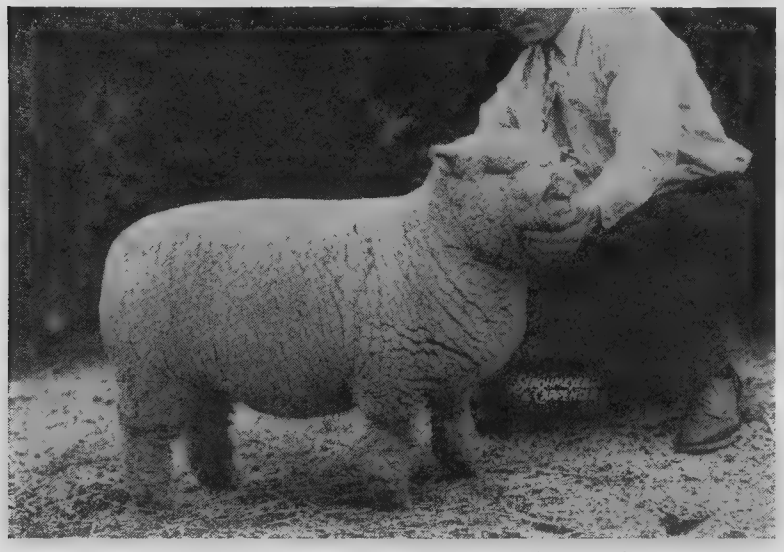


Fig. 6.—Champion Southdown ewe at Royal Winter Fair, Toronto, 1948. Owner, Don Head Farm, Richmond Hill, Ont.

and forehead. It yields a fairly short, fine wool, grading fine medium to medium staple. Fleeces average between 5 and 8 pounds.

Southdown lambs are noted for their fattening qualities, becoming well finished at an early age and at a weight of between 60 and 70 pounds. Due to this fact they may be held over for a more favorable market without injuring the quality of carcass or becoming overweight. This characteristic as well as their superior mutton qualities has led to the use of Southdown rams for crossing with ewes of other breeds, where the aim is to produce early maturing lambs or for the production of hot house lambs.

Ewes of this breed are not regarded as being prolific or as good milkers as some of the larger breeds, though they make good mothers.

Shropshire.

Sheep of this breed are medium in size, mature rams weighing 175 to 225 pounds, and ewes 140 to 180 pounds. They are low set with compact, smoothly turned symmetrical bodies. The wool usually measures from 3 to 3½ inches in length and grades medium to low medium staple. The wool covering of the head is quite distinct, as it extends over the ear and face, leaving only the tip of the nose clear. The ear is quite small and usually covered with light brown hair or wool. This breed is early maturing and produces a lamb carcass that is well fleshed in the region of the high priced cuts and of a desirable weight.

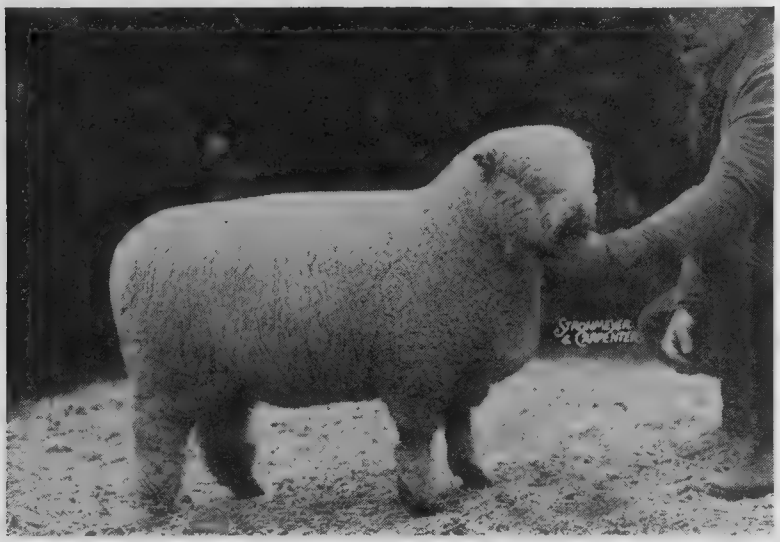


Fig. 7.—Champion Shropshire ewe at Royal Winter Fair, Toronto, 1948. Owner, Fred Gurney, Paris, Ont.

The heavily woolled head especially around the eyes, is a handicap when Shropshires are exposed to winter storms or when attacked by dogs or coyotes. This breed makes the best showing where feed conditions are favorable, especially on pasture when it is not necessary to travel too great distances. They are not as widely distributed in Alberta as some of the other Down breeds.

Leicester.

This breed is found more extensively in eastern Canada than west of the Great Lakes. It is a breed of fair size, rams weighing from 200 to 275 pounds, and ewes 175 pounds and over. They have a broad well fleshed back and loin, well turned body, with a fair leg of mutton. Compared with some other breeds they appear upstanding. The wool extends to the hocks and knees and forward to the head leaving the head and lower legs bare. The wool is long, measuring 7 to 8 inches, and is fairly coarse, usually grading low staple to common and braid. The fleece average 8 to 10 pounds in weight. It is an open fleece unsuitable to animals that are liable to exposure or extreme cold. For this reason Leicesters are not as desirable as some of the other breeds for use on the open ranges, but can be successfully raised when suitable shelters are provided.

Leicesters are good foragers and fatten readily under liberal feeding. The Leicesters have been found exceptionally good for the production of crossbreds, the lambs carrying the fattening qualities, size, and fleece weight of the Leicester as well as the

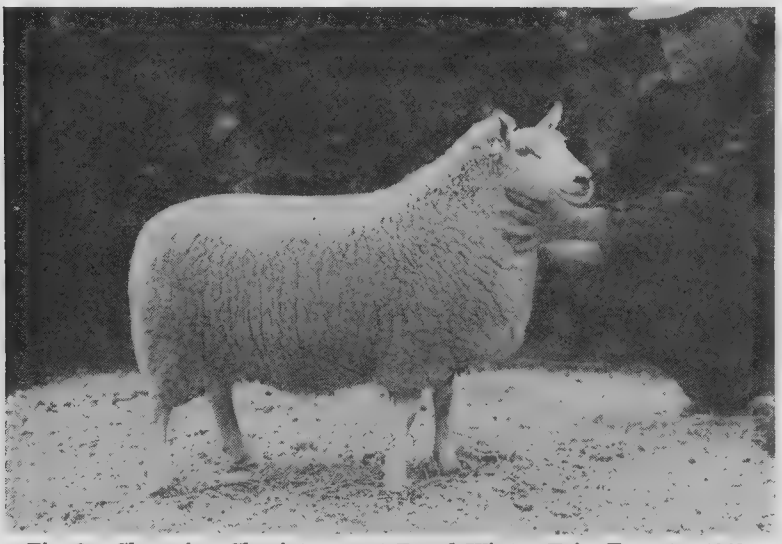


Fig. 8.—Champion Cheviot ewe at Royal Winter Fair, Toronto, 1948. Owner, David McDowell, Mercer, Pennsylvania.

quality of fleece and meat of the Down or other breeds with superior mutton and wool qualities.

Cheviot.

The Cheviot is one of the most stylish and attractive breeds of sheep. Their alert appearance, white color, black nose and hoofs, body carriage, and general outline make this breed one that is admired. Mature rams weigh 175 to 200 pounds and ewes 125 to 160 pounds. The ewe produces a fleece of medium weight, averaging 5 to 8 pounds, of fair quality, usually grading low medium staple.

Cheviots are noted for their length of life, prolificacy, hardiness and low mortality of lambs. Cheviot lambs are usually strong and vigorous at birth, which accounts for their low mortality. They are not as rapid maturing as are most of the Down breeds.

Dorset Horn.

Comparatively few Dorset Horn sheep are found in Alberta. They are of fair size, similar to the Hampshire or Suffolk in this regard, but do not show quite the mutton quality or conformation of these breeds. Both sexes are horned and the hair on face and legs is white or light grey. The Dorset Horn does not shear a heavy fleece, but the wool is of fair quality. The Dorset Horn is one of the most prolific breeds of sheep for the reason that it is possible to produce two crops of lambs each year.

Fig. 9.—Champion Dorset Horn ram at Royal Winter Fair, Toronto, 1948. Owner, P. E. Dearing, Exeter, Ont.

In districts near large markets sheepmen make use of the Dorset Horn ewes for the production of hothouse lambs by mating them with Southdowns, Shropshires and to a lesser extent, rams of the other Down breeds. The crossbreds possess many of the mutton characteristics and properties of the ram and are desirable lambs for the butcher trade.

Rambouillet.

This breed has been developed in France and is of Spanish origin. Through careful selection the size and weight, quality of fleece, mutton qualities and hardiness, were all improved. In size the Rambouillet is only moderate, rams weighing approximately 225 pounds at maturity and the ewes 150 to 160 pounds. The head is usually reasonably free of wool, not extending below the eyes, while the ears and bare portion of the face is covered with fine white hair or short, fine wool. The rams usually have large spirally turned horns, and the females are hornless. The fleece is compact, should be from 2½ to 3 inches in length, of excellent quality, showing good crimp and lustre, and produces a fleece weighing 10 pounds or more.

The hardiness, banding instinct and longevity of the Rambouillet makes them particularly well adapted for range conditions, and for this reason they are the predominant breed maintained in the range area of western Canada. They lack somewhat in ideal mutton qualities, may possibly be criticized for lack of size and length of

Fig. 10.—Champion Rambouillet ram at International Livestock Exposition, Chicago, 1948. Owner, C. P. Harding, Sigel, Ill.

wool staple, which has led to the use of some of the mutton breeds for crossing on some of the range flocks.

Intermediate Breeds.

In order to produce a breed of sheep with better mutton qualities for western range conditions the Ramouillet has been crossed with breeds of the Long Wool classification. Through many generations of inbreeding and rigid selection for the desired characteristics, breeds of sheep known as the **Romeldale, Columbia, Panama, Corriedale,** and **Targee** were formed. The Corriedale breed is the popular breed in Australia and New Zealand and has also been raised to some extent in the United States and Canada where it has not proved to be as suitable as the Rambouillet for range conditions.

Romnelet.

The Romnelet is still regarded as a strain of sheep rather than as a breed because of its recent origin. Romney rams were bred to Rambouillet ewes and the crossbreds were mated. Rigid selection was practised with several generations of the progeny until at the present time considerable uniformity exists. This strain of sheep is being selected for adaptability to range conditions but since they possess better mutton qualities than the Rambouillet it is anticipated that they may also fill a need in farm flocks. They are being developed in the west by the Dominion Experimental Stations. Rams and ewes have been sold to private breeders and indications are that they are meeting with favor and will ultimately be recognized as a breed.

Fig. 11.—A typical Romnelet ewe.

Cotswold, Lincoln and Romney.

These breeds of sheep are of the long wool type and are not being raised in western Canada because of their inadaptibility to conditions. A number of flocks of these breeds are maintained in eastern Canada. Some have also been used as foundation animals in the formation of the intermediate breeds previously mentioned.

Karakul.

The Karakul breed originated in Asia. They are considered fur bearing animals, the pelts of the lambs being called Karakul, Persian, Astrakhan and other names. The pelts have the highest value when the lambs are one to three days of age. According to commercial furriers Canadian and American pelts are lower in quality than those produced in Asia. The Karakul is of little value for mutton.

SELECTION OF A BREED

At least two fundamental features must be kept in mind in connection with the selection of any breed of livestock. Firstly, they should be acceptable from the standpoint of modern day market demands, and secondly, they must be well adapted for the conditions under which they are maintained.

The Down breeds, for the most part, conform quite well to the first requirement. Oxford Down, as has already been pointed out, do not qualify quite as well in this respect. On the other hand, the Southdown lacks the size and weight for age as compared to the other breeds in this class. The Shropshire is recognized as an excellent mutton sheep with a fleece and skin of good quality. At the same time, the heavy wool covering over the face, together with the fact that they are comparatively short in the leg, suggests that they may be regarded as being more suitable for smaller areas with abundant pastures rather than under conditions where pastures are relatively sparse.

The larger breeds, characterized by longer woolled and more open fleeces, have disadvantages as far as western Canada's climate is concerned.

The Suffolk and Hampshire breeds, medium in size, satisfactory from the viewpoint of early maturity and fleshing qualities, reasonably hardy and active, fit into western environment quite well. Both of these breeds, however, are inclined to have dark fibred wool, and Suffolks are criticized for bareness of belly wool. Both of these weaknesses are being overcome by more careful selection.

SELECTION OF BREEDING STOCK

The proper selection of breeding stock is one of the most important factors making for success in sheep raising. No improvement is possible without intelligent choice of both rams and ewes based on a careful study of the characteristics of the existing flock, and the ideals, or ambitions of the breeder, as developed through an understanding of market trends and conditions.

The Selection of the Ram

The ram has been demonstrated to represent one-half, or in some cases, even more than half of the flock. If the ram is not superior to the ewe flock, the lambs produced will not be an improvement on their mothers and consequently no progress will be made from year to year. If, on the other hand, the ram is superior to the ewe flock, the lambs produced should show improvement over the ewes. Since ewe lambs replace the older ewes each year, the improvement of the flock from year to year is only secured by the use of carefully selected rams.

In purebred flocks the selection of the ram is based upon breed type, as well as mutton type. It is essential in these flocks to maintain uniformity in breed type and correct mutton conformation. In grade flocks the rams are selected chiefly for mutton type and quality. The continued use of rams of the same breeding will lead to a greater uniformity in the market lambs with consequent higher prices.

In the selection of a mutton ram the points to be considered should be as follows:

1. **Breed Type:** Breed type is of considerable importance, especially in selecting a ram to head a purebred flock. Uniformity of type in both purebred and grade flocks should be the aim of every breeder. This can only be secured by the continued selection of rams possessing the recognized characteristics of the breed to which they belong.

2. **Masculinity:** As shown by vigor and boldness that are indicated by full bright eyes, large nostrils, broad head, short thick neck, and well developed forequarters.

3. **Mutton conformation and quality**: Rams of the mutton breeds should be low set, with sufficient bone, and a broad well turned thickly and firmly fleshed body from brisket to dock. The hind legs should be well fleshed, with a deep full twist and flank. The skin should be pink and the fleece long, fine and dense, and characteristic of the breed to which he belongs.

The ram should not be heavily fitted since a ram carrying too much flesh is frequently a slow breeder and sometimes fails to "settle" ewes until he becomes normal in flesh and vitality.

4. **Size:** This depends upon the breed and age of ram being selected. No undersized ram should be selected as lack of size is likely to result in slower maturing lambs than is desired.

5. **Age:** Immature rams are not as efficient for breeding purposes as mature rams. Inability to serve ewes or disregard for ewes in season, often occurs when immature rams are used. It is possible, however, to select a suitable ram lamb of the early maturing breeds, dropped early in the season, i.e., January, February or March, with sufficient size and vitality to successfully serve a small flock of ewes. Since the future development of ram lambs cannot be predicted with as great accuracy as older rams, mature rams should be given a preference in selection.

Selection of Breeding Ewes

The quality of lambs and profits that will be derived from the sheep raising enterprise are largely dependent upon the selection of foundation ewes and ewe lambs that will compose the future flock. It is fundamental for the beginner as well as for the experienced breeder, that the selection of foundation ewes for the establishment of the flock, and of ewe lambs to replace discarded ewes should be intelligently made. Through the use of good sires and the retention of the best ewe lambs, considerable progress may be made in the course of four or five years.

As in the selection of rams, breeding ewes should be selected upon their conformity to ideal mutton type, and if purebreds, to breed type also. The chief characteristics that should be looked for

Fig. 12.—A breeding ewe should show fair size and conform to the low-set thick mutton type.

in making a selection of ewes for improved mutton qualities are as follows:

1. **Age:** Ewe lambs are of necessity selected for the replacement of discarded ewes. The owner necessarily speculates on their future development, and has to maintain them in his flock for a year before they are old enough to breed. Some effort should be made to select the ewe lambs that are out of the better type of ewes. Yearling ewes are regarded as the ideal from the standpoint of age, because their reproductive life has just begun. Their future development does not have to be predicted, and they are usually sound in udder and teeth. There is less speculation attached to the buying of yearlings than with ewes of any other age. Ewes, two years or older, if selected for foundation stock, cannot be depended upon to reproduce as long as yearlings. Among the older ewes offered for sale may be found those that, for some reason other than broken mouths, unsound udders, and lack of development, have been unprofitable to the owner.

2. **General appearance:** Breeding ewes should be well grown, healthy and active. Undersized, unthrifty ewes should not be selected, as they are likely to produce slow maturing, undersized lambs. Good health is indicated by an active, sprightly appearance, a bright clean pink skin (sometimes occasional dark skinned individuals are found in the dark faced breeds), bright eyes, and by a fleece that is clean, lustrous, and containing plenty of yolk. Poor health may be recognized by emaciation, chronic coughing, a pale skin, dry harsh wool and scouring. Such ewes should not be selected for foundation stock. Emaciation, however, may be due to the ewe suckling lambs, insufficient feed, as well as internal parasites.

The ewes should conform to the desired mutton type. They should be fairly low set, with broad, deep and capacious bodies, carried uniformly throughout—indicating feeding capacity and plenty of space for the embryonic development of the lamb. Such ewes will also usually have plenty of milk to nourish their young. Avoid the selection of upstanding, narrow chested, shallow bodied ewes for as a rule they are poor feeders, and a disappointment as reproducers and milkers.

3. **Soundness of teeth and udder.** Without a full set of sound teeth breeding ewes cannot be expected to handle sufficient feed to nourish the unborn or suckling lambs and maintain their own bodies. Ewes with "broken mouths" should be avoided in selecting foundation stock, as their ability to reproduce and nourish lambs has been lowered through their difficulty in consuming food.

Occasionally ewes offered for sale have udders which through accident or disease are unable to produce milk, or so blemished

that milk cannot be drawn from the udder. Such ewes will be unable to nourish their lambs and therefore only ewes with sound, functional udders should be selected.

4. **Fleece:** Some consideration should be given to the fleece in the selection of ewes. Fleeces not only provide a source of income to the owner, but they should also provide sufficient protection against cold rains and low temperatures normally experienced in Alberta. A fine fibred, compact fleece, of fair length, extending well over the body and especially the belly, provides ample protection and yields a fair income.

CATCHING AND HANDLING SHEEP

The use of correct methods for catching and handling sheep is important, not only to prevent waste of energy, and time, but also to prevent injury and discomfort to the animals.

When animals are corralled in a small pen, catching can be most effectively done by grasping the flank, as less struggling on the part of the animal is experienced. In the field the use of a shepherd's crook is recommended. There is a tendency on the part of inexperienced sheepmen to grasp the animal by the wool. This is a careless practice, often causing serious bruises, and should be discouraged.

A sheep is most easily led by holding the neck of the animal with one hand and pressing the end of the dock with the other. Pulling by the head or neck causes the animal to struggle and resist being led.

When sheep are to be placed on their rump for shearing, feet trimming, or any other purpose, the left arm should be placed around the front of the animal, and the right hand passed under the body and grasping the hind leg on the far side as shown in the accompanying picture. By pulling steadily on the leg and raising the forepart of the body the animal is most easily brought to the desired position.

A well trained sheep dog can be used to advantage in facilitating the handling of sheep, especially in large flocks. On the other hand, a poorly trained dog may cause considerable worry to the flock and trouble to the shepherd.

Fig. 13.—Sheep can be most effectively caught by grasping the flank.

Fig. 14.—The proper way to grasp a sheep to set it on its rump.

Fig. 15.—The simplest way to guide sheep.

Fig. 16.—Sheep cannot be moved easily when grasped in this manner.

ESTIMATING AGE BY THE TEETH

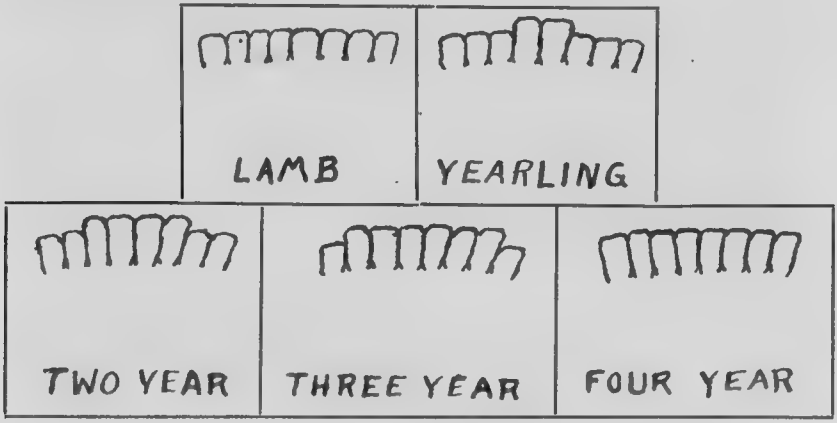
The age of sheep up to four years can be easily determined by examining the teeth. The mouths of sheep are equipped with a full set of twenty-four molar teeth on both upper and lower jaws, for the mastication and grinding of food. In addition to these, four pair (eight) of incisor teeth are provided along the front of the lower jaw, which together with the lips and upper gum, enable the sheep to gather and cut off each mouthful of food. The incisor teeth have been called "nippers," which in itself describes their use. It is the incisor teeth that are examined to determine age.

At about three weeks of age lambs usually possess a full set of eight incisor "milk teeth." These are smaller and narrower than the permanent incisors. At the age of twelve or fifteen months the center pair of "milk teeth" are lost and replaced by two permanent incisors which can be readily determined by their size. Permanent incisors are longer and broader than the "milk teeth."

Each succeeding year an additional pair of "milk teeth" are replaced by permanent ones in regular order, so that when sheep are four years of age a full set of eight permanent incisors will be found. Sheep with one pair of permanent incisors are one year old; two pairs of incisors, two years old; three pair of incisors, three years old; and, four pair, four years of age or older. The time

at which these changes take place varies with the conditions under which the sheep have been kept. With well fed sheep the changes take place slightly earlier than with animals not kept in good condition.

The following illustration indicates how the teeth appear at different ages:



After four years of age there is a tendency for the teeth either to wear down until they become like stumps, or loosen and fall out. It is therefore impossible to tell exactly the age of sheep after they are four years of age. If one or more incisors are missing in mature animals, they are called "broken mouthed," or if all incisors are missing the term "gummer" is given them.

Sheep that have been well cared for and properly fed will often maintain a full mouth until they are seven, eight or even nine years of age, while range sheep or poorly cared for sheep that have suffered many periods of food shortage and exposure to severe weather begin to lose their teeth at five or six years of age. As soon as ewes become "broken mouthed" their usefulness is much impaired.

FEEDING AND MANAGEMENT OF THE FLOCK DURING THE BREEDING SEASON

Feeding

The breeding season for sheep is normally in the fall and early winter months. It occurs during a season when ewes may be in a thin and unthrifty condition due to scant pastures and following a more or less strenuous suckling period. When ewes are in such a condition at breeding time there is a tendency toward the production of a small, unthrifty lamb crop and a lengthening of the breeding season due to some ewes failing to conceive at one or more services. Experience and experiments have proven that such results can be overcome by the feeding of suitable rations during the breeding season.

The term "flushing" has been given to the feeding practice which has for its purpose an increase in the thrift of the ewes and as a result a more satisfactory lamb crop. The necessity for flushing and the response secured depends upon the condition of the ewe and also on the condition of the pasture and feeds fed prior to the breeding season. It is in the case of the thinner, more unthrifty ewes that the greatest effects of flushing will be secured.

The providing of succulent pasture just prior to and during the breeding season is regarded as the most suitable, as well as the most economical method of flushing. This, however, necessitates early breeding under Alberta conditions, and can therefore only be recommended for farmers with equipment to handle lambs under January, February and March conditions.

Rape pasture has for several years given excellent results at the University of Alberta during the breeding season of purebred ewes. This is indicated by the following figures. Grouping all ewes of five different breeds together during a four year period the following number of lambs per ewe were dropped:

2 year olds	1.71	lambs	per	ewe
3 year olds	1.90	"	"	"
4 year olds	2.04	"	"	"
5 year olds	1.93	"	"	"
6 year olds	1.78	"	"	"

Although not all of the lambs represented by the above figures were raised, it does indicate the benefit which can be secured by the use of a succulent pasture during the breeding season.

No data are available on the comparative merits of the various pasture crops for flushing, but it is logical to assume that there would be very little difference between the various pastures pro-

vided they furnish an abundance of fresh succulent food throughout the breeding period.

On most farms, however, the breeding season is usually in November and December, when pastures are not available and the flock is under winter feeding conditions. Flushing may be satisfactorily accomplished under these conditions by the use of grain together with a good quality of hay. The feeds should be nutritious and provide the necessary constituents for reproduction and flesh building. Feeding carbonaceous rations would not prove as suitable as rations that furnish a fair amount of nitrogenous feeds. For this reason, the addition of alfalfa and sweet clover hays, bran or linseed meal would improve the ration. When twins or triplets are born, it is not uncommon for one of the lambs to be small and weak. On account of the loss of these weak lambs, and the lambs crushed by the ewe, or by death through lack of milk, a larger death rate often results; but even though this be true, the total number of lambs raised may still be increased. Mature ewes in domestic flocks should be capable of nursing two lambs. With the production of a large number of lambs, there will always be a supply of lambs to give to those ewes which have for various reasons, lost their lambs, and thus most of the ewes in the flock will be doing their share in raising the lamb crop.

Management

The aim of the sheep owner should be to have his ewes successfully bred within a three or four week period so that the lambing season will not be prolonged. During the breeding season it is advisable to check the performance of the ram in order to make certain that the ewes are actually being bred. It frequently happens that rams, due to various causes, may be non-breeders, or in the case of one or more ewes, certain abnormalities may result in their failing to get in lamb. A little attention at this time, and more especially during the first few days, may avoid considerable disappointment later.

At the beginning of the breeding season the ram should be in a thrifty condition, not carrying a surplus of flesh. Heavy service is a considerable strain on the ram and unless fed liberally during this season he may lose weight and vitality.

There are various methods of managing the ram during the breeding season. One of the most common practices, especially in grade flocks, is to allow the ram to run continuously with the ewes. This system works out satisfactorily in small flocks, as the limit for one mature ram would be between thirty-five and fifty ewes. Less time and attention is necessary when this method is followed.

In large flocks, or when it is desirable to conserve the energy of the ram, there is some advantage in a modification of the above system, when the ram is allowed to run with the ewes during only part of the day. This allows for special feeding, and makes possible for him to handle a flock of from fifty to seventy-five ewes.

Under certain conditions it may be an advantage to practise what is known as "hand coupling." Under this system the ram is not allowed to run with the flock, but ewes in season are brought to him for service. Usually a "teaser" is used. A "teaser" is an active ram, usually not being used for service, upon which an apron is tied to prevent copulation. He is allowed to run with the ewes for a short time each day to detect those that are in season. By use of this system a ram is capable of serving from seventy-five to one hundred ewes.

Well developed ram lambs may be used. Obviously it is not to be expected that they will handle as large a flock as a mature ram. Given reasonably good care, however, they should be able to take care of from twenty-five to thirty ewes.

In order to keep a check on the ewes as they are bred and become pregnant, lampblack or ochre should be painted upon the breast of the ram before being placed with the ewes. In this way records can be kept of the individual ewes as they become marked. At the end of a 16 or 18 day period the breast of the ram should be painted a different color. By following this practice ewes that are served again in their second "heat" period can be noted and if necessary recorded. If the coloring is changed on the ram every sixteen or eighteen days, the dates on which the ewes are due to lamb can be calculated and proper care given them during that time.

The painting of the breast of the ram has an additional advantage in that it is possible to determine how successful a breeder he is. If a large number of the ewes continue to be bred at each successive period the owner knows that the ram is either infertile or for some other reason is not settling the ewes. If certain ewes continue to be bred at each successive period, then one may have reason to suspect that something is abnormally wrong with the ewes; they may be infertile, due to abnormal or inactive reproductive organs or to obstructions, such as too long a dock or tags that make mating impossible.

WINTER FEEDING AND MANAGEMENT

Feeding

Numerous experiments conducted at the University of Alberta have shown, beyond a doubt, that the fleece weight and the strength and size of lambs are greatly influenced by the rations fed during pregnancy. Since practically all the income from sheep is derived from these two sources, the importance of winter feeding can be readily seen.

Certain feeds may be suitable from the standpoint of maintaining the flock in a satisfactory condition of flesh, or for fattening, but fail to provide a ration that will be sufficient for the development of strong, vigorous lambs. Soft, flabby, undersized, weak, goitred, and dead lambs take heavy toll each year in many flocks, a condition which can be traced, in many cases, to improper feeding of ewes during their pregnancy period. Unless the ewes receive the food constituents from which lambs and wool can be produced, fair sized, strong lambs, and normal wool growth cannot be secured.

Considerable experimental work has been conducted at the University of Alberta with a view to securing definite information with respect to the suitablity of the common Alberta roughages, when fed both singly and in combinatioin to pregnant ewes. The results of the earlier experiments were reported in an earlier published bulletin. The findings of these trials showed that certain feeds were unsuitable. Later work was outlined to find out what supplements could be fed in conjunction with the more unsuitable hays, when these form a portion of the ration, in order to secure stronger and better developed lambs.

The following discussion in connection with the various feeds is based on the results of these trials.

Alfalfa Hay.

Alfalfa hay is probably the only single roughage that contains a sufficient amount of all the required nutrients to carry the ewes successfully through the winter. During three winter trials the ewes were fed an average of 3.9 pounds of alfalfa daily. They were maintained in a better condition of flesh, gave birth to heavier lambs and produced heavier fleeces than was the case where they were fed any of the other single hay rations. Alfalfa hay is especially valuable as a roughage during the suckling period prior to the pasture season. When alfalfa has been added to a non-leguminous ration it has greatly improved the performance of the ewes. Since

it has been demonstrated that alfalfa can be successfully grown in many districts in Alberta, sheep owners should find it to their advantage to grow and feed this valuable crop.

Sweet Clover Hay

Sweet clover ranks next to alfalfa as a roughage for wintering ewes. Although its protein content will compare favorably with alfalfa, sweet clover is not as palatable a roughage as alfalfa hay. On account of its coarser nature more difficulty is experienced in curing than in the case of alfalfa. For this reason, much of the sweet clover available for sheep feeding lacks the quality found in alfalfa.

Prairie Wool

Prairie Wool is usually composed of a mixture of grama, western wheat grass and dry land sedges. Spear grass may also be found, and if present in large amounts it is not safe to feed to sheep. Prairie Wool occasionally contains considerable dead grass from the previous year, its presence lowering its nutritive value. Prairie Wool of good quality is the most nutritious of the native grass hays, and will maintain the ewes in a fair condition of flesh throughout the winter when fed as the sole ration.

Upland Prairie Hay.

Upland Prairie Hay is composed of varying amounts of Blue, Slender Wheat grass, Brome, and June grasses. Prairie hay varies widely in composition. Sometimes small amounts of slough grasses, or other coarse and unpalatable plants are found in Upland Prairie Hay. The greater proportion of Upland grasses the more palatable and nutritious will be the hay. During the three winter trials, when Upland Prairie Hay of medium quality was fed, ewes receiving an average of 3.3 pounds of hay, lost an average of 21 pounds in weight, but produced strong and fairly good sized lambs. Difficulties arose through weakness and lack of milk in the case of a few of the ewes that had lost considerable weight. In such cases lambs were not properly mothered and became unthrifty. The addition of whole oats, one-quarter to one-half pound daily, depending upon the quality of the hay, maintained the ewes in satisfactory condition, increased the size of the lambs, stimulated wool growth and avoided the difficulties of weakness and lack of milk on the part of the ewes. (See value of silage, p. 32.)

Slough Hay.

As a general rule, slough hays are coarse, tough, unpalatable and have a low nutritive value. They cannot be satisfactorily fed

to sheep, as they will not consume a sufficient quantity of it to supply even their own body requirements.

Oat Hay (Oat Greenfeed) (Green Oat Sheaves).

Oat hay, when fed alone, has proven to be a very poor roughage for pregnant ewes from the standpoint of lamb production. Soft, flabby, weak, goitred, partially hairless, and dead lambs were produced. Some years only a few lambs reached market age, while other years eighty per cent of those born were marketed. The oat plant is known to be deficient in certain minerals necessary for growth and reproduction. This fact explains why oat hay has proven to be almost equal to Alfalfa hay for maintaining the ewes in a satisfactory condition of flesh but not for reproduction.

In those districts where Oat hay is the principal roughage it can be satisfactorily used as the sole ration, providing it is supplemented with potassium iodide. Keeping in mind the fact that variety is an advantage in any ration, better results will be obtained when other hays or silages are fed along with Oat Hay. This does not, however, eliminate the necessity of feeding potassium iodide.

Brome, Red Top and Slender Wheat Grass (Western Rye) Hays.

Due to their coarser nature these hays are usually found less palatable and nutritious. Where these hays are available they may be fed in conjunction with other more nutritious hays or, if fed alone, should be supplemented with grain in sufficient quantities to maintain the ewes in a thrifty condition.

Timothy Hay.

The use of Timothy hay should be avoided on account of its relatively high price, low nutritive value, and injury to skin and value of fleece. The market price of Timothy hay is usually higher than any other roughage grown in the same district, and, for this reason, its use can not be recommended in preference to other more suitable roughages. It is unpalatable, and too often coarse and brittle, and the dry heads work into the fleece, irritating the skin, making shearing difficult, and lowering the selling price of the wool. Timothy hay cut when immature is much superior to hay cut when in full bloom.

Oat Straw

Oat straw lacks palatability and is low in nutritive value. At the University ewes fed on oat straw alone lost so much flesh, and became so weak, that it was necessary to supplement it with a liberal supply of other feeds in order to keep the ewes alive and put them into a reasonably thrifty condition for lambing.

When fed along with alfalfa, or some other nutritious roughage, or when grain mixtures are fed, oat straw may be fed in small amounts. With the feeding of oat straw, however, the same difficulty was experienced as when oat hay was fed—there was a tendency toward flabby, weak, goitrous and dead lambs. This points to the necessity of properly supplementing rations containing oat straw with potassium iodide.

Value of Silage.

Oat, Sunflower, or Corn silages, providing they are of good quality, may be fed as a part of the ration, if the complete ration supplies the required nutrients.

Both oat silage and sunflower silage have been fed at the University of Alberta in combination with both oat hay and prairie hay. Silage was heavily fed, the ewes consuming all they would eat in one hour. The average amount of oat or sunflower silage fed daily was from 3 to 3.5 pounds per ewe. Hay was also full fed. When either of the two silages was fed, the ewes were maintained in a much better condition of flesh than when dry roughages alone were fed. The better maintenance of the ewes was also accompanied by heavier lambs and increased wool growth. Based upon dry matter, one pound of dry silage had a much greater nutritive content than one pound of dry hay.

When the ration consisted of any substantial portion of the oat plant, either in the form of oat hay or oat silage, or even the combination of the two, the result was the production of varying numbers of weak, goitrous, and dead lambs. This difficulty, however, was overcome by the feeding of potassium iodide.

Where available, silages made from alfalfa or sweet clover, provided they are of good quality, can also be fed. The fact that silages made from these two legumes are comparatively rich in protein suggests that they are better adapted for feeding with carbonaceous hays.

Silages made from Canadian or Russian thistles, or grasses other than have been mentioned, should not prove injurious to pregnant ewes, provided the normal chemical changes have taken place in the silo and that the silages are free from mold or poisonous plants. The addition of molasses at time of silo filling has resulted in better legume and grass silages being produced.

Roots.

Turnips and mangels are relished by the flock during the winter and where one takes the trouble to grow these it will be found that they add succulence and variety to the ration.

The Use of Grain Mixtures in Winter Rations.

Whether or not grain need be fed depends upon how well the roughage ration maintains the ewes in a thrifty condition. When roughages of poor quality are fed it may be necessary to supplement with grain in order that the lambs may be well developed and the ewes have sufficient milk at lambing time.

Recent experiments have shown that grain feeding during the latter half of the pregnancy period gives almost as good results as feeding grain during the entire pregnancy period.

After lambing, grain feeding is advisable to meet the increased needs of the ewes for milk production. Oats is possibly the best single grain that can be fed during this period. The addition of a small amount of bran and linseed oil meal or both would be an advantage under certain conditions. It is well to feed from ¾ to 1 pound of grain per head daily until the ewes go to grass.

Salt and Minerals.

All sheep should have access to a salt mixture at all times. The feeding of iodized salt to prevent the birth of soft, flabby and goitrous lambs is strongly recommended for all districts. Either iodized block salt can be used or the flock owner can mix 4 ozs. potassium iodide with 100 lbs. salt. It is best to dissolve the iodide in a small amount of water and to sprinkle it over the salt before mixing.

While the need for cobalt has been demonstrated for sheep on diets restricted to grass hays and grains, there has not been sufficient data available to prove that there are specific areas in Alberta that have soils deficient in cobalt. However, since cobalt is relatively cheap and since salt companies are marketing a cobaltized-iodized salt mixture, the feeding of cobalt can be recommended as insurance against the possible development of cobalt deficiency. Many commercial mineral supplements contain cobalt. For adding cobalt to salt it is suggested that 0.3 ounces of Cobalt Sulphate or Cobalt Chloride be dissolved in water and sprinkled over 100 pounds of salt. This can best be done when the iodide is added to the salt.

When ewes are being fed grass or cereal hays a calcium supplement should be fed. Equal parts of bonemeal or limestone and the salt mixture is the usual method of supplying the mineral needs of pregnant ewes.

Management

During the winter the flock should be provided with a suitable shelter. An expensive building is not necessary to properly house the flock. Single ply board or straw sheds will provide the essential requirements. The main features to keep in mind are that the

building should be located on high dry ground, should be kept clean, well bedded and properly ventilated, and of sufficient size to avoid crowding. It should also be well lighted, as sheep do not thrive as well when kept in dark quarters. From 10 to 15 square feet of ground space should be provided for each ewe.

Exercise during the winter months is very important, as it promotes thriftiness in ewes and results in a stronger lamb crop. Sufficient exercise may be secured by the providing of yards of sufficient size. Except when storms prevent, feeding can be done out of doors, and if feeding racks are placed some distance away from their shelter this will induce the ewes to take a greater amount of exercise.

There is danger of abortions during the winter through injuries caused in various ways. Principal among these is the jamming of ewes in their effort to get through a narrow door or between obstacles that are close together. This may be overcome by providing doors of good width and by careful handling of the flock.

Fig. 17.—Showing one trimmed and one untrimmed hoof.

Before the flock is turned out on grass it is advisable to give some attention to the feet. Foot rot, deformed feet, crooked legs, and broken down pasterns are often due to lack of attention in this connection. The hoof should be cut down level and the toes trimmed. This may be done with the use of an ordinary knife, pruning knife or toe clippers.

Attention should also be given to prevent fleeces from becoming filled with chaff and thereby decreasing their value. For this reason the flock should not be allowed access to straw stacks or be fed from improperly constructed feed racks. Combination racks, which provide for both grain and roughage feeding, when closely boarded to within 5 or 6 inches of the bottom, prevent chaff from falling into the fleeces. The accompanying picture shows one type of such feed rack. From 18 to 20 inches of rack space should be provided for each ewe and a 10 foot rack built for feeding on both sides would therefore accommodate from 12 to 14 ewes. Feeding on the ground may also be done, but under this system considerable more feed is wasted.

Fig. 18.—Properly constructed feed racks means a saving in feed as well as maintaining a clean fleece.

Water should be provided daily even when snow is available, to insure that their needs for water is supplied. Salt is also necessary, and a Potassium Iodide salt mixture is recommended as a preventative against the occurrence of goitre in newborn lambs. For information concerning the use of this mixture the reader is referred to page 33.

CARE OF EWES AND LAMBS DURING THE LAMBING SEASON

If best results are to be obtained it is essential that considerable attention and care be given to the flock during the lambing period. It is at this time that more losses, ailments and difficulties occur than during any other season. Since the majority of lambs in Alberta are born in April and May, the lambing season takes place while the ewes are still under winter feeding conditions, although the temperature is usually high enough during most of the time to make close confinement in the barn unnecessary. Some farmers with small flocks have been successful in allowing the ewes to lamb around straw stacks or in the barnyard. There is danger, however, especially with larger flocks, of many avoidable losses occuring by such practice, since close observation and individual attention cannot be given the flock.

When the lambing season approaches and particularly when no record has been kept of the date each ewe was bred, the flock should be watched carefully each day and those ewes that show signs of lambing may be separated from the main flock where they can be given special attention and feed, in order to reduce losses to a minimum.

The enlarging of the udder and vulva can usually be noted a few days before the ewe is to lamb. As the time for lambing approaches the ewe becomes restless, may refuse to eat, and usually separates herself from the flock. The observation of these symptoms enables special attention to be given to the ewes and lambs during the time when losses are most likely to occur.

It will facilitate the handling of the flock if provision can be made for small pens in which the ewes can be placed a few days before and after lambing. Hinged, or movable partitions can be so arranged to provide the pens necessary within the larger winter shelter. Lambing pens should never be crowded because lambs may be trampled, crushed, or become separated from their mothers. Crowded lambing pens may result in some lambs suckling other ewes, and also produce ewes, which through continual separation from their lambs, disowning one or both of them.

It may be necessary to clip off loose wool tags and dung locks around the hindquarters and udder of the ewes. This will not only make it easier for the young lambs to nurse, but will at the same time prevent avoidable loss caused by wool balls in the stomach of the young lamb. The pregnant ewes, after being placed

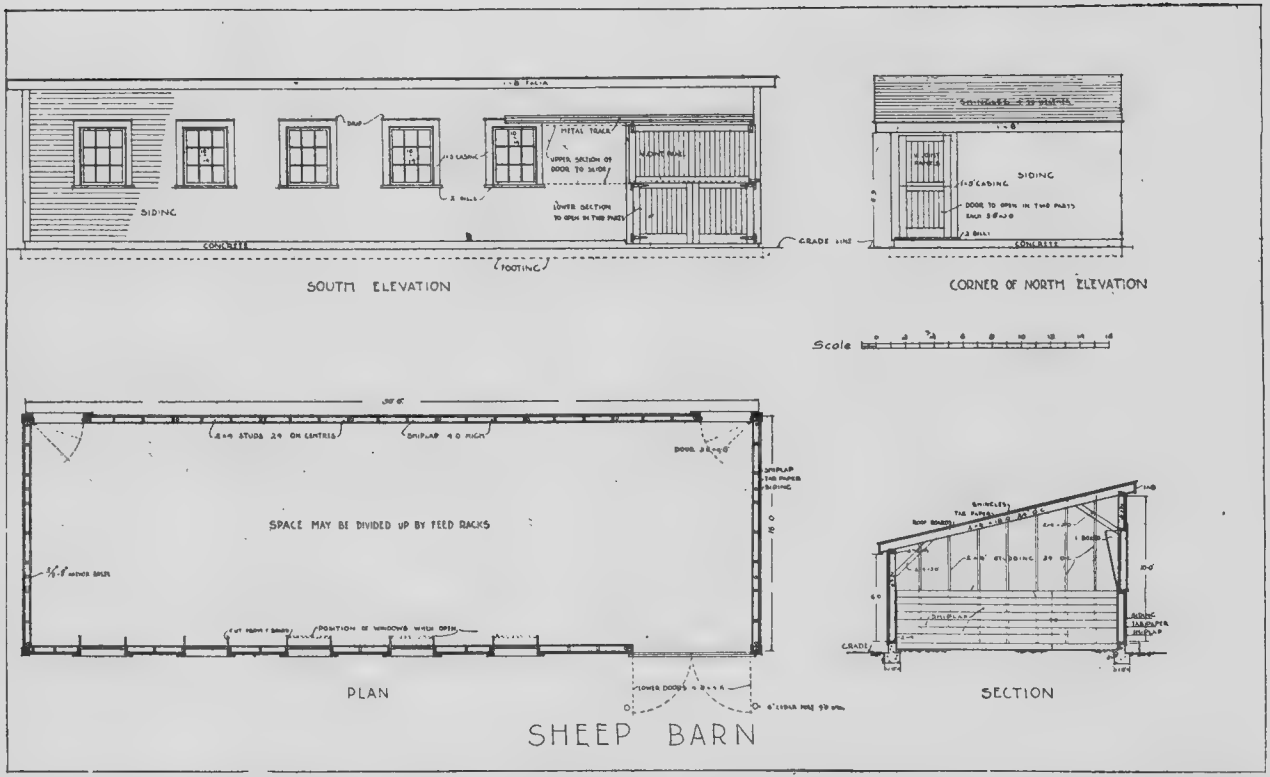


Fig. 19.—A cheap, shed-roof frame building. 16 x 50 feet, without any interior fittings, but suitable in every way for keeping sheep. A flock of about eighty sheep can be wintered comfortably in it. Published by permission of Professors Grieg and Shaw, University of Saskatchewan.

in the lambing pen, should be watched closely until the lambs have arrived in order that proper care and attention may be given at this particular time.

There are various difficulties which may arise during the lambing season, for which assistance or attention on the part of the attendant is needed to prevent serious losses.

Ewes when laboring sometimes lie in a position so near the wall that it is impossible to expel the lamb. Careful observation is necessary to prevent this occurrence, as too long a delay will cause the death of the lamb in the uterus.

Lambs are born enclosed in a covering or sac which if not ruptured during birth must be removed from the nostrils immediately after birth. In most cases either the struggling of the lamb or action on the part of the ewe performs this duty, but in a few cases she fails to do so, due to the fact that she is either too weak, is busy expelling the second lamb, or only gives attention to one of her lambs. Breathing must be established within a few minutes, and this can only be done when the covering has been removed.

Lambs born during cold weather often become chilled to such an extent that death may result unless proper treatment is given. Such lambs are often immersed in warm water and rubbed dry with a woollen cloth to stimulate the circulation of blood. A chilled lamb can be warmed by placing it in a box near the stove, or providing the box with a hot water jug wrapped in a blanket. In the case of weak lambs that fail to nurse within a reasonable time, milk taken from their mothers should be fed until they are strong enough to suckle. In severe cases the administration of a few drops of whiskey in a little water, or a diluted solution of aromatic spirits of ammonia will prove beneficial.

Occasionally apparently lifeless lambs are dropped. Immediate attention must be given these lambs to revive them. The mucus in the nostrils and mouth should be first removed. Vigorously massaging the body, especially just back of the forelegs, gently slapping the ribs and blowing in the nostrils, will usually stimulate life processes. A tablespoonful of corn syrup or molasses every few hours will also supply strength to a weak lamb.

Not infrequently the ewe has difficulty during parturition, due to one or more of many causes, in which cases mechanical assistance is required. Excessive size of lamb, or large headed lamb, or abnormal presentation of lamb are among the most common causes of difficult lambing.

Other abnormalities are the expulsion of the lamb bed (inversion of the uterus), retention of afterbirth and inflammation of

the udder. The prevention and treatment for the above ailments are fully discussed in the section on diseases.

The problem of transferring a lamb to a foster mother arises in every fair sized flock. When lambs are born dead, or die soon after birth, the mother can often be given a lamb to raise. An orphaned lamb, or a twin or triplet, can be given to such ewes. Such practices make the bottle feeding of orphaned lambs unnecessary, and increases the rate of gains in the case of twins or triplets.

Many methods have been tried to induce ewes to adopt lambs. One of the earliest methods was to skin the ewe's dead lamb and tie the pelt upon the one to be adopted. This method is still practised. If a ewe loses her lamb at birth she may be encouraged to adopt another lamb by smearing it with some of her "cleanings." Isolation of ewe and lamb into a small pen should follow such practice. It may be necessary to hold the ewe to allow the lamb to suckle for the first few days. Many believe that the ewe will "mother" the lamb as soon as the lamb passes feces formed from the foster mother's milk.

Feeding cow's milk to lambs is sometimes necessary when milking ewes are not available to adopt them. For this purpose a wide-necked bottle with a nursing nipple is used. In bottle feeding there are a few things to be kept in mind, especially in the early stages—small amounts at frequent intervals, milk of blood temperature and cleanliness of nursing bottle and nipple.

METHODS OF IDENTIFICATION

It is essential in purebred flocks, and is desirable in grade flocks, that some method of identification be used. It facilitates the keeping of records as a basis for registration in purebred flocks and in the case of grade flocks assists materially when it comes to selection and culling.

There are several methods of marking. The placing of metal tags in the ears is the most common and possibly the most satisfactory method. Usually the initials of the owner are placed upon one side of the tag and consecutive numbers placed upon the other face of the tag.

Ear notching is another method, and one that may lend itself to use in grade flocks or where it is desirable to identify lambs from different sires and for identification of ownership in the case of mixed flocks.

All purebred breeders must either tattoo or use ear tags. The breeder must apply to the Canadian National Live Stock Records for and be allotted letters for his exclusive use with which to identify

sheep lambed his property. If identifying by tattoo marking, the letters allotted the breeder must be placed in the ear, left or right, designated by the Canadian National Live Stock Records. In addition to the identification letters, there must also be tattooed in the other ear the flock number of the animal, followed by a designating year letter to signify the year of birth. The letter "D" signifies that the animal was born in 1949, the letter "E" that the year of birth was 1950, the letter "F" 1951, and so on.

If this system of tagging is used the purebred breeder must order the ear "tags from the Canadian National Live Stock Records. The tags will show the breeder's letters allotted him by the Canadian National Live Stock Records and a flock number followed by a designating year letter. This identification tag must be placed in the right ear." Ear tags can be placed in the ear at any time after birth without causing the ear to droop, providing the tag is placed fairly close to the head.

DOCKING

The value of docking needs very little discussion. Practically every sheep owner realizes the importance of it and performs the operation without questioning its necessity. The operation is simple, requires little time, and there is practically no danger of loss if properly done.

When the tail is not removed manure adheres to the wool on the tail and around the anus, making a good place for invasion of maggots. Undocked lambs do not present as trim and attractive appearance as compared with docked lambs, and for this reason the former are discriminated against when offered for sale. The effect of leaving ewe lambs undocked may be even more serious than in the case of market lambs, as the presence of the tail with its accumulated filth may interfere during the breeding season in preventing normal service.

Docking should be done when the lambs are between five and fourteen days old. Lambs should not be castrated the same day, as the shock suffered by both operations may be too severe. The younger the lambs are docked the less severe is the effect, although it is not advisable to dock lambs before strength and thriftiness have been established.

The tail should be removed at the second joint from the body. There are two general ways of docking, one by searing and the other by cutting, the only difference being that in the first case the end of the dock is seared over, preventing the loss of blood, and when the dock is cut off with a sharp knife the dock is not seared and allows a greater loss of blood.

Fig. 20.—Docking by knife or searing iron is easily done.

There are two principal kinds of searing irons, one shaped like a chisel, the other a hinged instrument, that sears through from both sides. The irons are heated to a cherry red. The operation should be quickly done to prevent the heat from burning the anus or vulva. When a docking chisel iron is used the lamb can be held as shown in picture (Fig. 20 lower). When the hinged searing iron is used the tail is usually pulled through a hole in a board one inch in thickness, removing tail flush with board.

When searing irons are not hot enough or if the operation is not quickly done the tissues become more or less inflamed and usually a thick scab is formed under which infection may develop. The thickness of the scab prevents the skin around the sore from closing up. This condition and the presence of pus delays healing, so that the wound of lambs docked with the searing iron heals less quickly in most cases than when the knife is used.

Docking with a sharp knife is more quickly accomplished and less equipment is required. The sharper the knife the more easily the operation is accomplished. The lamb can be held as shown in (Fig. 20 top), and the tail removed by cutting through from the top or from underneath. One man can perform the operation, while when using searing irons two men are required. Blood flows freely from the freshly cut dock. Usually the flow of blood is rapid for about ten seconds. Within one minute the flow generally ceases. However, in a few cases the rapid flow of blood may continue, and in such cases it is necessary to tie a string around the dock to save the life of the lamb. When this is done the string should not be allowed to remain on longer than necessary. To prevent infection it is desirable to apply a disinfectant to the dock after the operation and thus insure rapid healing.

CASTRATION

All male lambs, not intended for breeding purposes, should be castrated. Uncastrated lambs, after reaching fifty or sixty pounds, are continually worrying the ewe flock. This results in slower gains being made by not only the lambs, but the ewe flock as well. If ram lambs are allowed to remain with the ewes during the latter part of August and September, there is danger of "catch" breeding, which makes the handling of the flock in early spring more difficult.

Ram lambs produce a carcass of undesirable conformation with a more or less pronounced strong taste, thereby reducing their market value. Livestock buyers discriminate against uncastrated lambs, and the cut in price is sufficient to make castration a profitable practice to follow.

Castration is not a difficult operation to perform. It should be done on a warm clear day. If the day be cool and damp the lambs become chilled and death may follow. Even if death does not take place, there may be a lowering of the vitality and thrift of the lambs for a shorter or longer time. Dry, clean quarters should be provided to prevent infection from manure and filth.

Lambs are usually castrated at between seven and fourteen days of age. When this operation is performed at a younger age, a large percentage of the lambs may lack sufficient strength to withstand the shock. When older than fourteen days, severity of the shock is increased and the recuperation extended over a longer period.

There are two ways in which castration can be done. Most authorities claim that after the lower third of the scrotum is removed the testicles can be squeezed out sufficiently to be grasped with fingers or teeth and pulled out.

The second method of castration, after one-third of the scrotum is removed, is similar to that of castrating pigs or calves, where the testicular, or outer covering, is cut, exposing the testicles. In the case of lambs, however, it is necessary to exercise considerable care not to cut too deeply into the testicle, in which case its removal is difficult. Difficulty may be experienced when the first few lambs are castrated, but as soon as the positions and manipulations are learned this method of castration becomes simple.

Before castrating, the hands of the operator, the knife and the scrotum should be washed with a good disinfectant. Immediately after castrating, the empty scrotum should be rinsed out by lifting up the scrotum and pouring disinfectant into both cavities from a bottle.

Even though plenty of disinfectant is used, infection may enter. This is indicated by a swollen scrotum that may be easily detected a few days to two weeks after castrating. The enlarged scrotum is due to closing up the wound before all infection has drained out. It should be opened up to allow the necessary drainage, and again disinfected.

The use of a "Burdizzo" for castration is simple. This instrument merely crushes the testicular cords until they are severed without rupturing the outer skin. The testicular tissues are absorbed and there is no danger of infection. The best results are secured when the right and left cords are crushed separately. It is necessary to re-examine the rams in a few weeks to make sure the cords were severed in the first operation.

SHEARING AND HANDLING OF FLEECES

In ordinary practice sheep are shorn only once each year, usually in the spring or early summer, after the cold weather has passed. Earlier shearing will often necessitate some extra provision for shelter or protection or to avoid losses, while on the other hand, more or less loss of fleece and discomfort to the sheep results if the wool is left on for any considerable length of time after the warm weather arrives.

Shearing is best done on a bright warm day and when the wool is dry. In order to prevent the fleece from becoming dirty, the work should be done on a clean floor or sod. In the event these are not available, a canvas will be found very useful.

Two methods of shearing are common. One is by use of hand shears and the other with the machine clipper. The machine method of shearing has proven most rapid, and when the flock is fairly large it will justify the purchase of a hand or power machine. With the use of the machine the fibres are cut closer to the body and a smoother appearance given to the shorn animal than by hand clipping. There is also less danger of cutting the animal and making second cuts of the fibre.

There is no single method of shearing which is recognized as the best. Practically all experienced shearers work with the animal held upon its rump, with the back leaning slightly toward the operator, in which position most parts of the animal's body are readily reached with the shears and less struggling on the part

Fig. 21.—Fleeces should be removed intact, rolled from rump to shoulder with skin side out to give each fleece a good appearance and to enable proper grading.

Fig. 22.—A slatted table is excellent for spreading fleeces and removing tags and manure before rolling and tying.

Fig. 23.—A screen-top wool table can be used for the same purpose.

Fig. 24.—The use of the wool box adds to the appearance and ease of packing.

of the animal is experienced. As a rule, the practice is to start by opening up the fleece with a cut extending from the under side of the neck to the belly and from this opening shearing head, neck, legs and the belly. The wool on the sides and the back can then be removed by long sweeping strokes of the shears. The aim of the shearer should be to shear reasonably close to the skin, avoiding cutting the animal, or making second cuts of the fleece and secure a fleece with the neck, back and sides intact to enable proper tying and grading.

The intact fleece should be then placed shorn side down, all dung locks and tags removed and the edges folded in to form a strip not over two feet in width, then rolled from rump to shoulder so that the best grade of wool is on the outside. It should be tied only with paper twine, as other kinds of twine, such as binder twine, tangle up with the fibres of the wool and lowers the selling price of the fleece.

The use of a wool box for tying gives to the fleece an attractive appearance. Fleeces that have been boxed are more compact and can be readily packed into the large shipping sacks. Satisfactory tying of the fleece can be done, however, without the use of a box, providing the fleece is carefully removed and rolled.

The Canadian Co-operative Wool Growers, Limited, maintains assembling and shipping stations in all provinces in the Dominion and represents a satisfactory medium through which a large volume of the Canadian clip may be marketed under normal conditions.

DIPPING

In most flocks it is usually found necessary to dip at least once each year to insure freedom from ticks and lice. Dipping also has an additional advantage in the improvement of the skin and wool. The most favorable time is in the spring, shortly after the sheep have been shorn. At this time the entire flock, both ewes and lambs, should be dipped. In badly infested flocks, it is sometimes necessary to dip twice yearly, the second dipping usually being done in the fall before cold weather has arrived.

A warm bright day should be selected when the fleeces are dry, and dipping is preferably done in the morning so as to give the sheep a chance to dry out again before night. Many kinds of sheep dips, both in liquid and powder form are procurable and, provided they are properly used, they should give satisfactory results.

A galvanized zinc, cement, or wooden tank set in the ground with the top level with the surface should be provided. In addition, suitable pens and runways facilitate the handling of the flock and prevents wastage of the dip. In the dipping of sheep it is necessary to see that each animal remains in the tank until the fleece is well soaked. The draining pen is so arranged that all the dip which runs off the sheep flows back into the vat.

SPRAYING

Some sheepmen with fairly large flocks have successfully used a spraying method for treating sheep for ticks and lice instead of the usual method of dipping. Groups of twenty or more sheep are crowded fairly closely in a small, well drained pen and the sheep dip sprayed over the backs of the animals until the fleece is fairly well saturated. The spraying equipment is similar to that used for whitewashing or treating cattle for warbles. One or more nozzles are at the end of a boom long enough to reach all parts of the pen. Those who have used the spray method in western Canada have only sprayed the topside of the animals and claim that sufficient spray will seep through to the underside. While any commercial dip can be used as a spray, D.D.T. has been found to be efficient. The amount of dip required for spraying is no more than when sheep are dipped in a vat.

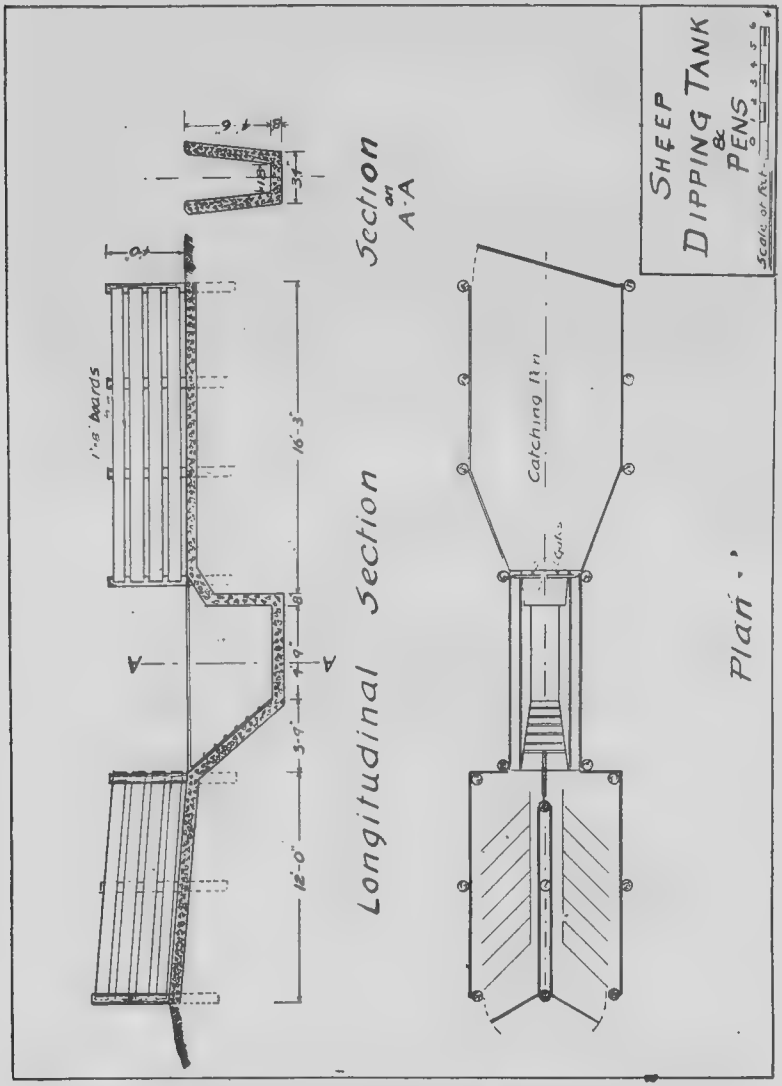


Fig. 25.—Drawing showing arrangement of dipping tanks and pens suitable for medium-sized flocks.

SUMMER FEEDING AND MANAGEMENT

Provided suitable pastures are available the flock may be carried through the season with very little if any supplementary feeding. On some farms there is a certain amount of native pasture available which will provide plenty of grass for the flock throughout the season. Sheep prefer and do best on high land pastures as the vegetation is more palatable and nutritious. Foot-rot is likely to develop when sheep are forced to pasture on wet and low lying land. Summerfallow and stubble fields may in certain seasons be utilized to help out as a sheep pasture. There are many districts in the Province where most of the land is under cultivation, and under such conditions it may be necessary to plan for pasture crops to meet the needs of the flock.

Fall Rye.

This pasture provides the earliest of all cultivated pastures. It is also the earliest pasture to be finished, for as soon as heading takes place it is coarse, unpalatable, and provides little vegetation. After the rye has been pastured the field may be re-seeded to rape or some other suitable pasture which makes possible the utilization of such fields for a succession of crops during one pasture season. For the best results fall rye should be seeded in the middle of summer the year previous, at the rate of about three bushels per acre.

Oats.

Oats can be seeded in the spring at the rate of three bushels per acre as soon as the land is tillable. It reaches a growth of about eight inches in five to six weeks, at which time the flock is turned on. This pasture induces fair gains for both ewes and lambs. Unless kept well and evenly pastured the oats will become mature, coarse and unpalatable. During the latter part of the summer, this pasture shows little growth and does not provide as much fodder as it does during the early summer months. In some cases it is possible to plow and re-seed these fields to rye in August which will provide late fall and spring pasture.

During periods of wet weather there is usually more or less waste in the case of oat pasture due to the fact that the ground is soft, the growth rank, and a considerable portion of the crop will be lost by tramping.

There is an advantage in seeding two or more fields to oats at intervals of three or four weeks to provide a succession of

pastures. After the flock has eaten down the first seeded pasture and removed to the second, it will be found that in a few weeks, provided there is reasonable moisture, the earlier seeded field will have sufficient second growth for re-pasturing.

Oats and Rye Pasture.

This mixed pasture has been used for several years at the University. Although it does not result in the animals making better gains than on oat pasture alone, it provides feed for a longer period—the rye providing fodder after the oats have become mature or fail to provide sufficient growth. Another advantage of this mixed pasture is that it provides an early fall rye pasture the following spring. The seeding of one and one-half bushels of oats and one and one-half bushels of fall rye per acre has proven satisfactory.

Rape.

Rape pasture is one of the best pastures for sheep, both ewes and lambs making more rapid gains than on oat or oat and rye pastures. For fattening lambs after weaning, or ewes for market, or for flushing ewes prior to and during the breeding season, rape pasture can be recommended. It is a middle summer to late fall pasture since the early seeded rape makes slow growth during the cooler spring months. During the warmer months of summer and late fall the growth is rapid so that rape pasture allows heavier pasturing than on cereal grain pastures. Seeding broadcast at the rate of from five to six pounds per acre is the general practice.

Rape may cause bloat when the animals are first placed on the pasture. This is especially true if sheep are turned on while the rape is wet with rain or dew. Placing them on rape when the field is dry and the animals have been liberally fed other feeds will largely eliminate this danger. The animals should soon become adjusted to the rape pasture and can be kept on it through rains and heavy dew without danger of bloat. When sheep or lambs are confined to rape alone there may be more or less scouring. Better results may be obtained from pasturing rape if the flock has also access to a grass field.

Alfalfa.

Although alfalfa has proven to be a nutritious pasture crop, it is very likely to cause bloat in sheep. When alfalfa is used as a pasture crop for sheep it is necessary to exercise extreme care. Heavy losses have been experienced when sheep have been turned on to alfalfa pasture wet with dew or rain. Mature alfalfa is less liable to cause bloat than immature alfalfa pasture. Providing an

alfalfa-grass pasture mixture or allowing the sheep access to a grass pasture adjacent to the alfalfa reduces the possibility of bloat. A number of experienced sheepmen in many parts of the Province avoid the use of alfalfa pasture because they are unable to cope with the bloat problem successfully.

Sweet Clover.

It is adapted to practically all types of soil and may be more widely grown in the Province than alfalfa. It supplies a large volume of pasturage and is a crop that might very well receive more consideration by sheepmen in Alberta. There is also less danger from bloat than in the case of alfalfa, very little difficulty being experienced in this connection, providing reasonable precautions are taken.

Red Top, Brome, Slender Wheat Grass (Western Rye), Crested Wheat Grass.

These and other permanent grasses or mixture of these make suitable pastures for sheep throughout the season. Those crops most suited to the districts should be grown. Crested wheat grass is most suitable in the drier areas; red top can be used on heavier, moister soils, while the other grasses grow well under average conditions. Extremely wet soils should not be used as sheep pasture.

Mixed Legume-Grass Pastures.

Mixed pastures containing both legume and grass most suitable to soil conditions will provide more forage than any single crop pasture. When alfalfa is used in the mixture it is suggested that not more than 3 lb. be of alfalfa seed per acre in the mixture in order to lessen the danger of bloat. Such pasture mixtures can be successfully used if reasonable precaution is taken.

SUMMER CARE

Some form of shelter should be provided while on pasture to protect the animals during severe storms and from the direct rays of the sun. Trees are possibly the best natural shelters, but if these are not available and winter shelters are long distances away from the sheep pastures, temporary shelters may be provided. When placed on well drained ground, straw or board roof shelters open on all sides are satisfactory.

During the summer, sheep should be watered at least once daily, or if possible water should be available at all times. Salt should be provided regularly or made available to the flock so they

may take it when needed. Coarse stock salt is preferable, and may be set out in troughs or boxes, but when this is done it should be kept under cover to prevent leaching and loss by rains.

WEANING

Lambs are usually weaned when around 5 months old. At this age the lambs have reached the stage when they will receive no setback when suitable pastures are available. Weaning at this time allows some time for the ewes to regain flesh and condition before the breeding season arrives. It is also necessary in purebred flocks, when ram lambs are being retained to wean before the rams have reached the age when there is danger of the ewes being bred.

Since it is desirable to dry up the ewes as quickly as possible, they should be placed on a scant pasture or dry feed. Every two or three days for the first week the condition of the udder should be noted and, if necessary, milked out in order to prevent serious udder trouble. After all danger in this connection is over, the ewes should be placed on good pasture to fit them for the breeding season.

At weaning time the lambs should be provided with as good a pasture as possible. In case the pasture is not particularly good, grain feeding at this time may be advisable. In purebred flocks ram lambs should be separated from the ewe lambs.

Weaning time affords a good opportunity for the culling of the breeding flock, for the selection of ewe lambs to be retained, and at the same time to compare the relative merits of various rams that have been used as sires during the past season in the larger flock. Such work is best accomplished when breeding records have been kept and lambs have been marked. Errors may be avoided, such as culling ewes that, due to their being heavy milkers and good mothers, may be relatively thin and lack condition. Records of the breeding flock are also of material assistance as a basis for the selection of lambs to be kept for breeding. The progeny of the best breeding animals in the flock can in this way be maintained and greater uniformity in the flock be developed. Where more than one sire has been used in the flock the result of each mating can be observed and this offers a guide in determining the most satisfactory matings for the following year. Improvement in the type and quality of the ewe flocks as well as the lambs is secured only when selection, culling and matings are intelligently made.

LAMB FEEDING

In certain areas of Alberta the fattening of range bred lambs has developed into a livestock enterprise of considerable importance. Each year comparatively large numbers of range lambs reach the end of the pasture season light in weight and in an unfinished condition. These "feeder" lambs leave the ranches on which they are raised and are available to be finished on farms where a supply of suitable roughages and grain is available. Over a period of years the rise in price which takes place between September, October and November, the period when the bulk of the feeder lambs reach the market, and December, January and February, when such lambs are finished for market, makes it possible to carry on such an undertaking on a reasonably profitable basis.

Lamb fattening usually consists of dry lot feeding with dry roughage and grain, but in areas where rape does well, lambs will make good gains on this forage, and in the case of heavier lambs in reasonably good condition when purchased, they may be finished for market without the use of grain. During the fall of 1937, at the University of Alberta, range bred lambs were carried on rape pasture from September 28th to November 2nd, and during that period made an average daily gain of .37 pounds. Lambs weighing from 70 to 75 pounds when placed on the pasture were finished for market at weights from 85 to 90 pounds at the end of the 35 day pasture period. This plan makes it possible to put weight on lambs cheaply and gives lighter lambs a good start for dry-lot feeding.

In connection with the purchasing of feeder lambs, good thrifty lambs weighing from 60 to 65 pounds are usually the best material. Lambs of these weights can put on from 25 to 30 pounds during the finishing process and this will allow for the utilization of considerable feed as well as providing for the advantage which may result from a rise in the market price between purchasing and selling and reach market at desirable weights.

If feeder lambs have been shipped some distance, and especially if they have been running on scant pasture before purchasing they should not be allowed access to lush pasture such as aftermath of hay fields or rape without being given at least a partial fill of dry roughage or turned into a pasture which has been eaten down. A sudden change to abundant forage may result in serious digestive troubles.

When lambs go into the feed lot proper they should be started on grain gradually, starting with about 0.1 pound or 1 pound to 10 lambs, increasing the amount by easy stages until they are getting from 1 pound to 1.25 pounds per head daily at the end of one month. If the object is to finish the lambs as quickly as possible, the daily feed of grain may be increased to 1.5 pounds per head. Toward the end of the feeding period lambs will eat very close to 2 pounds per head daily. This amount may be considered a maximum and would only be consumed by very strong lambs.

Fig. 26.—Market lambs of good type bred and finished at the University of Alberta.

Oats, barley and wheat may be used in lamb fattening. Standard re-cleaned screenings can also be utilized. Lambs prefer these grains whole rather than ground. Oats may be used more heavily in the early part of the finishing period than during the latter stages, and barley and wheat may be used interchangeably depending upon their relative price per pound. In connection with a lamb feeding experiment conducted at the University of Alberta during the winter of 1933-34, barley and wheat gave practically the same results in terms of rate and economy of gains. A suitable method of mixing oats and the heavier grains as the feeding period advances, may be worked out along the following lines:

	Oats (parts by wt.)	Barley or Wheat (parts by wt.)
First two weeks	2	1
Second two weeks	1	1
Third two weeks	1	2
Balance	1	3

Roughages of good quality should be used in lamb finishing. Hays which are not in good condition or are not suitable for sheep feeding should not be fed. In certain districts where lambs are fed, oat greenfeed is the staple roughage and can be used with fair

satisfaction, although best results are secured when it is fed along with some such hay as native upland hay or alfalfa. Alfalfa hay possesses certain qualities which make it very valuable for lamb feeding. To illustrate the beneficial effects of feeding alfalfa hay along with oat hay to fattening lambs, the following figures from an experiment carried out at the University during the winter of 1937-38 are shown:

	Lot I. Oat Hay alone	Lot II. Oat Hay and Alfalfa Hay
No. of Lambs	22	22
Av. Daily Gain	.22	.31
Av. Daily Feed:		
Oat Hay (lbs.)	1.37	.84
Alfalfa Hay (lbs.)	.....	.74
Grain (lbs.)	1.26	1.22
Feed for 100 lbs. Gain in Wt.:		
Hay	494.3	505.3
Grain	453.6	389.6

It is to be noted that the lambs which were fed alfalfa hay along with the oat hay made slightly more rapid gains than those fed the oat greenfeed alone, and while they required approximately the same amount of hay to make 100 lbs. of gain, they required considerably less grain. The oat hay was valued at $7.00 per ton, and on a comparative basis alfalfa hay was worth $13.00 per ton. In the light of this experiment and our general experience with alfalfa hay in sheep feeding, prospective lamb feeders should make every effort to grow a certain amount of alfalfa.

The figures in the above table will bear studying by the prospective lamb feeder apart from the alfalfa hay feature, because they set out quite typically the averages for daily gains, amount of feed eaten daily and the amount of hay and roughage required to put on 100 pounds of live weight.

When alfalfa or other legume hays are not available and particularly when oat hay is the only roughage fed, the feeding of a small amount of linseed oil meal is to be recommended. This supplement may be fed conveniently by mixing it with the grain at the rate of 10 pounds to 90 pounds of grain, or in other words, at the rate of 10 per cent of the concentrate mixture. The price which one is justified in paying for linseed meal for lamb feeding is governed very largely by the price of grain. In general it may be stated that linseed oil meal is not worth more per pound than twice the value of grain on the farm.

When the roughage portion of the lamb ration consists of hays other than alfalfa, consideration should be given to the feeding of some form of mineral. Light lambs being heavily fed on grain

may suffer from lime deficiency. In lamb feeding experiments, finely ground limestone has been used, and when added to the grain ration at the rate of 1 per cent has resulted in improvement in appetite and an increase in the rate of gain.

Lambs in the feed lot should have access to salt at all times. During a three month feeding period lambs will consume an average of 1 pound of salt.

The feeding of cobalt to fattening lambs has proved beneficial in several experiments. It is suggested that cobalt and the other mineral needs of lambs be met by feeding the same salt mixture as recommended for pregnant ewes (see page 33).

For the benefit of those who may contemplate lamb feeding and who have not had previous experience with this type of livestock production, the following table shows the rate of gain which may be expected and the amount of feed required under good feeding conditions to carry an individual lamb through a feeding period of 100 days:

Average Daily Gain	.25 to .3 lbs.
Hay Required	150 lbs.
Grain Required	125 lbs.
Salt Required	1 lb.
Linseed Oil Meal (if fed)	12 lbs.

LAMB MARKETING

Such matters as consumer demands, receipts, price fluctuations and conditions on the individual farms, all have a direct bearing on the question of marketing.

Market demand is an important factor in determining the most suitable weight at which to sell lambs. The tendency recently has been to favor lambs weighing in the neighborhood of 100 pounds. Lambs somewhat lighter, provided they carry the required finish, are acceptable. Buyers of lambs discriminate against those that are excessively overweight, undocked or not castrated.

The most ideal market condition would be to have lambs supplied at a steady rate throughout the year. Under present conditions in Alberta, however, this is not an easy matter. The bulk of the lambs usually reach market during the latter part of September, October and November, at which time the price has a tendency to drop. The supply during the winter and early spring months comes from lambs, the majority of which have spent some time in the feed lot. There is a reasonably steady supply of lambs during this time, with the result that prices are usually maintained at a fairly high level. The fact that during the late spring and early summer months comparatively few lambs are available, means that prices usually reach the peak at this time.

Under normal conditions seasonable price fluctuations are dependent on how regularly the market is supplied with lambs. In the fall when the bulk of the lambs are marketed there is usually a drop in price and as the supply of feeder lambs becomes less the price paid for lambs is increased. The highest price paid for lambs usually occurs about May and continues fairly steady until late in the summer when the number of current year lambs that reach the market increases.

Since most lambs from domestic flocks are born between February and June, the housing, climatic and feeding conditions under which they are reared vary according to the time of birth. The earliest born lambs require better shelters, and must be liberally fed in order for them to reach an earlier and higher priced market than the later born lambs. In addition little or no use can be made of pasture. March and April lambs are born at a time when less elaborate shelters are required. Good use is made of pastures, less grain is fed and the lambs usually reach market in August, September and October. Lambs born in May and June, although requiring little or no shelter when young, usually require an additional feeding period after pasture season closes.

These differences in conditions under which lambs are reared means that there is considerable variation in the cost of producing lambs for early and late markets. Since the shelters, pasture and feed conditions naturally vary on the different farms in Alberta, the question of the market which will prove the most profitable is one that will necessarily have to be worked out by each sheep owner.

Sheep Diseases

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The following discussion of the more common sheep diseases is intended as an aid in preventing sickness and also as a guide in treating sick animals. An accurate diagnosis must be made before treatment or disease control measures will be successful. Therefore, a veterinarian should be called to examine the flock when disease occurs. Sick animals can also be submitted to the Veterinary Laboratory, Alberta Department of Agriculture, Edmonton. There, the veterinary pathologists will conduct a post-mortem examination and make bacteriological cultures, if necessary, to determine the cause of the disease.

In administering drugs to sheep it is advisable to stand the animal in a corner and elevate its mouth slightly. By handling the animal in this way the danger of pouring a portion of the medicine into the lungs, and causing pneumonia, is lessened. A two-ounce dose syringe is the most convenient instrument to use in administering medicine. The tongue should not be held. The mouth should be kept closed and the animal allowed to swallow the medicine slowly. Or a spoon can be used to place the medicine in the mouth when just one animal or small number are to be treated.

LAMB DISEASES

Care should be taken at lambing time to prevent chilling or sudden changes in temperature, as the lambs may develop pneumonia. Weak lambs need energy or they may die. Give a tablespoonful of corn syrup every two or three hours until they show more activity. A raw egg will also help supply strength to a weak lamb. A teaspoonful of a good grade cod liver oil should be given daily for two or three weeks. This will supply vitamins A and D, which increase resistance to disease and prevent rickets.

The navel should be disinfected with tincture of iodine to prevent infection entering the broken umbilical cord. A small bottle, 1" x 1½", full of tincture of iodine should be kept on hand, into which the cord can be dipped until thoroughly disinfected. Use a fresh iodine solution for each lamb if possible.

Dysentery (White Scours).

This is a disease of the newborn that occurs within 48 hours or sometimes as long as a week after birth. There is a very fluid grayish diarrhoea with an offensive odor, accompanied by great depression, and the lambs stop nursing.

The disease is essentially filth-borne. Cold, wet, stormy weather during which lambing must take place in barns and sheds is conducive to the disease if the shelters have been allowed to become filthy. Such places must be frequently cleaned and freshly rebedded with clean bedding if danger of lamb dysentery is to be avoided. Clipping the long wool from about the udder and inside of the thighs of the ewe to provide cleanly conditions for the nursing is recommended.

Medical treatment is often unsatisfactory. Vitamin A pills or one teaspoonful of cod liver oil should be given daily. Milk, eggs and corn syrup can be given to build up the energy of the lamb. Sulfanilamide may assist in preventing secondary invasion of other bacteria.

Stiff Lamb Disease.

This is a disease that occurs usually in lambs 3 to 10 weeks of age. It is generally agreed that the disease is not infectious. The disease appears usually among winter or early spring lambs which are confined on account of the weather. As a result, their exercise and diet are restricted. A stiffness or paralysis of the legs is the most common symptom. Post-mortem examination reveals characteristic grayish or white streaks of degeneration in the muscles, especially those of the legs.

A teaspoonful of 10% phosphoric acid given daily for four days in milk effects a cure in some cases. According to some researchers, doses of vitamin E effectively cure many.

Goitre.

This disease is quite prevalent in certain sections of Alberta, but is probably more common in the vicinity of the foothills of the Rocky Mountains. Lambs from affected flocks usually show an enlargement of the thyroid gland in the region of the throat. Many are born dead, and some are born weak and die within a few days. The cause is attributed to a deficiency of iodine in the food and water. Unless the breeding ewes get a sufficient amount of this mineral, serious results follow.

On farms where this condition is prevalent, goitre can be prevented by the administration of potassium iodide daily for 3 months before lambing. It has been suggested that the dissolving of 4

ounces of potassium iodide in as small a quantity of water as possible, and then sprinkling it over 100 pounds of coarse salt, is the most convenient way of administering the drug. On certain sheep farms, potassium iodide has been given by dissolving ½ an ounce in the drinking water daily. This is said to be sufficient for 100 ewes. 1% iodized salt in the ewes' ration also gives good results in preventing goitre of lambs. For those lambs born with enlarged thyroid glands, the application of tincture of iodine with a soft brush once a day, has been known to reduce them to normal size.

Cobalt Deficiency.

Sometimes lambs are unthrifty, anaemic, and have a dry wool. If no bacteria or parasitic diseases are present, a cobalt deficiency could be suspected. Dissolve ½ an ounce of cobalt sulphate or chloride in one gallon of water and give a teaspoonful daily. Mixing one ounce of cobalt in 1,000 lbs. of salt is also effective. In deficient areas, cobalt should also be fed to the pregnant ewe.

Entero-Toxemia (Overeating Disease).

This disease is a frequent cause of losses of lambs in feed lots. The prevention is essentially a matter of management. A sufficient interval should be allowed after placing lambs in the feed lot to permit their digestive organs to become accustomed to the new rich feed. The ration should be graduated according to the size and condition of the sheep being fed, beginning at first with feed consisting mostly of hay or roughage, with only a small amount of concentrates, and later being gradually increased as the animals adapt themselves to the regime. The sheep should be graded according to size and condition, being penned for feeding in as nearly uniform lots as possible. A veterinarian should be called to establish the diagnosis and help in handling the flock to prevent further losses.

DISEASES OF THE EWE

Pregnancy Disease.

This is essentially an ailment of pregnant ewes, especially those carrying twins or triplets. The condition occurs during the last month of pregnancy, and is more common in ewes being maintained on dry feed with limited exercise.

The exact cause of the disease is not fully understood, though the above mentioned factors all appear to be more or less involved.

At first the affected animals stand off by themselves or lag behind the flock when being driven. Later they become dull and

weak, urinate frequently, and grind their teeth. The breathing may become faster and nervousness commonly develops. The affected ewe may be stupid or excitable, and appears to be blind. She refuses feed and drinks little water, becoming weaker and weaker and finally unable to rise. The ewe may lie flat on her side or she may lie on the brisket with the head turned towards the flank, sometimes for days before death occurs. Lambs born at this time are apt to be weak and unthrifty and in many cases die.

Pregnant ewes should receive a liberal allowance of clean, bright legume hay. In addition a grain mixture containing bran, 2% bonemeal and 1% iodized salt, should be fed daily for at least the last two months of pregnancy. With the grain, small quantities of molasses, corn syrup or pure dextrose may be given. Exercise is essential and to accomplish this the animals may be fed at some distance from the barn or pen where they are kept at night. The object should be to bring the ewes up to lambing time in a good thrifty condition, neither thin nor overly fat. A good ration will also build up resistance and energy in the developing lambs so that they are born thrifty.

Treatment of the disease as it occurs in the lambing shed is seldom successful, though some animals may recover if taken in hand early. Calcium gluconate or dextrose solution may be given intravenously, or molasses, corn syrup or pure dextrose given in the drinking water or as a drench.

Dystocia (Difficult Lambing)

Most difficulties in lambing are due to abnormal presentation of the lamb. A knowledge of how normal lambing takes place is helpful in determining the treatment or assistance required.

Previous to lambing there should be an enlargement of the external opening, sufficient for the lamb to be expelled through the effort of the ewe alone. After a few minutes of straining, the water bag should appear and rupture. After additional straining, the front feet appear with the head between, followed by the body with the hind legs extended. If the lamb is being normally presented, it is only in exceptional cases that it is necessary to give assistance. There may be, however, in the case of large lambs and more particularly with young ewes, times when some help is advisable. When it is reasonably assured that the ewe will be unable to expel her lamb by her own efforts, it is time for the attendant to render assistance. This may be done by pulling on the feet in unison with the straining of the ewe. Unless in extreme cases, excessive force is not advisable on account of the danger of causing internal injury to the ewe.

There may be several forms of abnormal presentation, such as the head and one, or both, of the front feet turned back, coming hind end first, the lamb turned on its back, or twin lambs being presented at the same time. The general practice is, if possible, to correct the position of the lamb. This may be done by first washing the hand and arm with disinfectant, and smearing the hand with vaseline and then working it slowly into the vagina. After the position of the lamb has been corrected, delivery will usually take place without additional help. Difficult cases may arise when it is impossible to get the lamb in the normal position, and under such conditions the best one can do is to obtain delivery with as little injury as possible to the ewe. Lacerations may occur; in such cases external lacerations should be treated with a disinfectant salve or ointment. If internal lacerations have occurred, the uterus and vagina should be flushed with a warm solution of one part creolin and fifty parts of water.

Eversion of Uterus.

This condition is occasionally met with in ewes, usually following a difficult parturition, and where there has been considerable irritation of the parts, after the lamb is born the ewe continues to strain until the uterus is forced out and hangs in a large mass from the vulva.

The displaced uterus should be carefully washed with a warm 2% solution of carbolic acid and then carefully pushed into place. The animal will struggle while this is being done, but it must be carefully restrained until the parts are all back in their normal positions. In replacing the everted uterus, the closed fist should be placed beneath the mass, which should gradually be pushed up into the vagina. Sutures through the skin on each side of the vulva, and passing over the opening, will often prevent a recurrence. These stitches should be removed after the animal ceases straining.

Mammitis (Blue Bag) (Inflammation of the Udder).

This is an inflammatory disease of the udder, commonly called "blue bag." It is especially common in early spring, when the flock has been placed on succulent pasture. As a rule, it occurs only in a mild form, but occasionally it has a gangrenous form from which there is no recovery.

In many cases the gland is hard, swollen and tender, often pitting on pressure. There may be loss of appetite, restlessness, and pain when the ewe is suckled. The udder may be dark red or purplish in color. The milk secretion is changed and may be either thick, stringy and streaked with blood, or again it may be only a watery fluid. Unless care is taken, the internal structures

of the quarter affected may be destroyed. In cases where the milk secretion is stopped, the flow may or may not return at the next period of lactation.

The affected animal should be removed at once from the flock and the lamb taken from her immediately. The udder should be milked frequently and hot applications applied. A treatment highly recommended and popular with many, is the dissolving of ½ a pound of epsom salts in a quantity of warm water. The ewe is placed upon her back, and absorbent cotton is dipped in the solution, which is applied to the udder. Beneficial results may also be derived from the application of camphorated oil or iodine ointment, massaged thoroughly into the udder. Sulfanilimide given orally will help prevent the infection from becoming a general blood poisoning of the system.

INTERNAL PARASITES

Grub in the Head.

Grub in the Head is also known as the sheep bot, sheep gadfly and grub worm. The sheep gadfly, "Oestrus ovis," attacks pastured sheep in the heat of the day, depositing its eggs in the sheep's nostrils. When hatched the worms crawl up into the sinuses of the head where they develop into full grown grubs.

When the sheep are attacked by the fly they shake their heads, stamp, and thrust their heads on the ground; they huddle together under trees or other shelter, holding their noses under one another to prevent an attack. In the spring, when the adult larvae, or grubs, loosen and pass out, the nasal catarrh is characterized by sneezing and a dirty nasal discharge.

Relief is best obtained by prevention. Gadflies rarely enter buildings, and if the sheep are provided with a darkened shed they may avoid attack. The noses may be smeared with tar. This is done with the use of logs containing holes two and one-half inches in diameter, bored four inches deep, at intervals of about six inches; salt is placed in the holes and tar is smeared around them.

Stomach Worms.

This is one of the most serious ailments that affect sheep. It is becoming prevalent in Alberta, and it is hoped the following information will assist in preventing losses.

Dullness, lowered vitality, anaemia, swellings under the lower jaw are the symptoms noticed most frequently.

Phenothiazine is one of the most effective drugs to remove stomach worms. Administration during the winter will destroy the worms and prevent the pastures becoming contaminated.

Phenothiazine may be given any time between the first of February and one month before lambing, or from five days after lambing to 24 hours before turning out to pasture. Treat all the adult sheep in the winter or spring, including the ram. When the pastures are contaminated with internal parasites, treatment should be given during the summer and again in the fall. Phenothiazine is obtainable from your veterinarian, Wool Growers' Association, or other organizations.

How to Administer the Treatment.

The treatment will be safely and efficiently given if a veterinarian is employed. Where the services of a veterinarian are not available, the following instructions should be closely followed:

1. Pen the sheep quietly and securely for treatment.
2. Sheep do not need to be starved before or after dosing.
3. If treatment is given just prior to turning the flock to summer pasture, the flock should be held for at least 24 hours to give the drug a chance to act, after which there is no danger of contaminating the summer pasture.
4. The sheep should be held between the legs of an assistant in such a way that the neck, not the shoulders, is between the knees. Avoid slippery floors and place the hind quarters in a corner or against a wall. The main object is to prevent the animal from sitting down, from moving the body from side to side, or from swinging its head sideways.
5. To hold the mouth open, use a mouth spreader with a spread of about two and three-eights inches to two and one-half inches. Endeavor to administer the tablet when the animal is not struggling violently.
6. The person giving the tablets opens the animal's mouth and inserts the mouth spreader so that the tongue is held forward underneath the lower bar of the spreader. Holding the tablet between the thumb and the first two fingers, the tablet is then brought well down to the root of the tongue by the fingers, when it is released and pushed over the "hump" of the tongue by the centre finger. To assist swallowing, the spreader is quickly taken out of the mouth and the assistant releases the pressure from the sides of the head and neck so that the animal can lower its head. The operation is repeated carefully for each tablet. A balling or pilling gun speeds the treatment of large numbers of sheep. Four tablets can be given to a sheep by an experienced doser in 30 seconds.

Careless or inexpert dosing may result in the accidental introduction of a tablet into the larnyx; in such a case, the sheep should

be given a drench of water and should be shaken with its head down. Always keep handy a drenching bottle filled with water.

No Danger from Over-Dosing.

Phenothiazine is not a poisonous drug. There is little or no danger of over-dosing, as sheep are tolerant to much larger doses than are recommended. The blood of the sheep has not been found to be adversely affected by phenothiazine; in fact the cells and haemoglobin often show an appreciable increase after treatment. This beneficial effect is probably due to the quick expulsion of blood sucking parasites that were removing blood from the sheep's body.

Although phenothiazine by itself is inclined to cause constipation, this tendency has been corrected in the compound tablets by the inclusion of a corrective ingredient in sufficient amounts to give the tablets a slightly laxative effect.

Pregnant ewes and those nursing young lambs have not shown any harmful effects from the treatment, either in the case of ewes or of lambs. As a precautionary measure, however, it is recommended that pregnant ewes should not be treated with the tablets any closer than one month before the lambing period. It is also recommended that treatment be deferred for at least four or five days after lambing.

Discoloration of Wool.

The urine of treated animals contains large amounts of a red stain for four days after dosing. In the case of ewes that are not shorn, if precautions are not taken, a part of the fleece may be permanently stained. The flock should be kept in a well-bedded pen or yard. Avoid bare floors or yards with a heavy clay or otherwise impervious surface. If it can be arranged to have the flock shorn and then treated 24 hours before being turned to summer pasture, danger of wool stains will be avoided. The young lambs are likely to become stained with urine in various degrees, depending upon how they nurse. Stains on lambs are not serious, as they will grow out and will not be noticeable by midsummer.

Drenching.

For summer treatment and in areas where phenothiazine is not available or too costly, a satisfactory treatment for the stomach worm and the black scour worm is the copper sulphate-nicotine sulphate drench given at 45-day intervals, the mixture being made up as follows:

Copper Sulphate (Blue Stone)	1½ ounces
40% Nicotine Sulphate	1 ounce
Soft Water	½ gallon

Heat the water and dissolve the copper sulphate in it. Add the nicotine sulphate immediately before use only, as the mixture will not keep.

In preparing this solution, only clear, blue copper sulphate crystals should be used; remove all whitened crystals; mix thoroughly, using glass, crockery or enamel ware as containers. Blue stone should not be mixed in metal dishes.

Doses—Adult Sheep	2 ounces
Grown Lambs	1 ounce
Smaller Lambs	½ ounce

It is not necessary to starve the sheep before drenching, but they should not be allowed to drink water for two hours after treatment. In dosing, the animal should be held with the head between the knees of the doser, so that it does not struggle and the head is not held too high.

This treatment should be repeated every 45 days throughout the grazing season.

Nodular Disease.

This is caused by young worms picked up with the grass from contaminated pastures. The worms enter the walls of the sheep's intestine, where nodules or knots are formed. When present in great numbers these cause serious interference with health and result in unthrifty sheep.

The eggs and young worms on the contaminated pasture lands are destroyed by the long winter frost and weather conditions; but in the animal host, that is, the intestines of the sheep, the nodular worms develop to maturity during the winter months and begin laying the eggs which contaminate the pastures each spring. To prevent this recurrence and thereby protect the lambs from developing nodular disease, it is necessary to destroy the egg-laying worm in the adult sheep before the animals reach the pasture in the spring. Phenothiazine is the only drug which is known at present to be capable of effective use in destroying all or most of these worms.

Tape Worm.

The tape worm, **Monieza Expansa,** is common in lambs. It is found in the intestinal tract and may be several feet in length. Lambs, heavily infested, become unthrifty, weak and emaciated. Segments of the tape worm are frequently seen in the feces of infected sheep. Some lambs show diarrhoea in the early stages and anemia may develop gradually.

The copper sulphate and nicotine sulphate, as described in the treatment for stomach worms, is the treatment recommended.

Lungworm.

Fortunately, lungworms appear to cause disease only when other more serious troubles exist. Treating for other worms, if present, good husbandry and feed, avoiding low-lying contaminated pastures, all aid in building up affected sheep into good flesh.

EXTERNAL PARASITES

Sheep Scab.

This disease is caused by the parasite **Psoroptes Communis Ovis,** and is one of the most serious diseases known to sheep. As it is classified as contagious, it is desirable that, should it make its appearance in a flock, government officials be notified at once, in order that the affected animals may be quarantined and the disease checked at the earliest possible moment.

To one accustomed to sheep, the symptoms of scab are not mistakable. Small inflamed areas occur where the mite irritates the skin. Intense itching and the formation of pustules follow rapidly. As the infections proceed, the itching increases until the animal appears to be never at rest, and loses flesh rapidly. The wool becomes taggy and falls out, especially along the flanks and back, exposing large areas covered with crusts, and with the accompanying rubbing and scratching. There is no mistaking an outbreak of scab when it occurs.

As explained, this disease is handled by government regulations. The proper procedure is to isolate all infected animals, and report to the Health of Animals Branch, Dominion Department of Agriculture, so the animals can be treated with the proper solution under careful supervision.

Sheep Ticks.

This is the most common external parasite found in Alberta. It causes great irritation, especially in lambs. Ticks are blood suckers and result in stunting the growth and cause general unthriftiness. Wool from sheep heavily infested with ticks is soiled and dirty, which decreases its value.

Sheep ticks are destroyed by dipping with a reliable commercial dip or sprayed with DDT according to manufacturers' recommendations. It may be necessary, in case of severe infestation, to repeat the dipping in 21 days to destroy the freshly hatched ticks.

MISCELLANEOUS DISEASES

Foot Rot.

This disease is quite common in some parts of Alberta, and is usually started in wet weather, the result of sheep having to stand in mud, or being pastured on low lying land.

There is considerable inflammation and soreness around the top of the hoof, and a well marked lameness. Following this, there may be separation of the hoof and small gangrenous spots appearing between the claws of the foot.

The foot should be cleaned thoroughly and all clay, sand or dirt must be removed. In the case where abscesses are forming, poultices may be applied. The swellings may afterwards be opened to allow the pus to escape. The foot should be treated with an antiseptic solution, such as a 5% solution of carbolic acid or a 2% solution of creolin. Where a large number of sheep are affected, they may be driven through a trough containing several inches of copper sulphate solution. One pound of this drug to a gallon of water is usually quite effective. It must be remembered that when this disease occurs, the flock should be removed to clean, dry pasturage at once. Consult your veterinarian about the use of the sulfa drugs in treating this disease.

Sore Eyes.

Disorders of the eye are not very common in this province. Inflammation may occur, the result of dust, injuries and occasionally the pollen of certain flowers. It may appear also in conjunction with diseases, such as nasal catarrh and grub in the head.

There is usually a well marked flow of tears and great sensitiveness when the eye is exposed to the light. The discharge is at first watery, but later may become clouded, and in certain instances ulcers will form.

It is necessary to remove all foreign matter from the eye as quickly as possible. The eyes should then be washed with a 3% solution of boracic acid or a 10 to 20% solution of argyrol. It is necessary to place the affected animals in a dark place until recovery occurs.

Keratitis.

This form of eye trouble has been known to occur in only a few instances. On certain farms it assumes an enzootic form and affects several animals in one flock. The first symptom will probably be a profuse discharge of tears from the eye. The eyelids become swollen, and as the result of inflammation the eye itself becomes clouded and the animal is temporarily blinded. In bad cases a small red spot may appear near the center of the eye-ball. In some animals both eyes may be affected at the same time. As the result of the inflammation the eye-ball may become clouded or milk-white, and in bad cases it may ulcerate and rupture. In instances such as this, the inner structures of the eye are totally destroyed.

As soon as a case of this trouble is noted in an animal it should be isolated from the rest of the flock and placed in a dark shed. A few drops of a solution of nitrate of silver, the strength of which should be one to five grains to one ounce of distilled water, should be placed in the eye once a day for several days. The placing in the eye of a 10 to 20% solution of argyol is also recommended. In addition, cold applications such as bathing the eye with wads of absorbent cotton saturated with very cold water, will also be beneficial. Some of the sulfa ointments are very effective in treating this condition.

Maggots.

Sheep are apparently very susceptible to maggot infestation. Maggots are the larvae stage of a fly, which are found in the vicinity of stables and barnyards. The adult fly deposits the larvae on the surface of the wounds, where tissues have been injured or torn in some way. They work their way into the skin causing excessive sores, which may result in the death of the animal. The tails of undocked lambs are favorite locations for maggot infection.

There is considerable irritation manifested by the animal rubbing the affected part. This area has a lifeless and spongy appearance, and when it is opened the living parasites are quite easily found in the decomposing tissues. This condition occurs only during hot summer months.

Cleanliness is the first essential in the treatment of this trouble. The wool should be clipped carefully from the vicinity of the wound and the dead or diseased tissues as well as the parasites should be carefully removed. The area should be washed with a solution of carbolic acid, one part to 20 parts of water. Many recommend the application of kerosene, and some spirits of turpentine. The latter should not be used on the raw wounds as it will cause too much irritation. A mixture of ether and sweet oil is probably one of the most effective remedies. Solutions of Creolin, Kreso or Izal may be used. The prevention of this trouble should be the first consideration and in cases of injury the application of pine-tar or equal parts of lard and sulphur will prevent the larvae from gaining entrance into the body.

Wounds.

This is the separation of living tissue, and in sheep are usually caused by attacks from dogs or lacerations made by barbed wire. On account of the fleece of the sheep, hemorrhage as a rule is not excessive, the wool quickly matting and causing coagulation of the blood. In the way of treatment the parts should be

carefully washed with some antiseptic solution and all dirt and foreign substances removed, the edges of the cut drawn together and held in place by either bandages or stitches. Astringent solutions such as alum or lead acetate may be applied. If excessive hemorrhage has not occurred, the parts may be smeared with ordinary pine-tar. Powdered sulfanilimide should be placed in the wound to prevent infection. It would be advisable to spray around the wound with a fly repellant to prevent maggot infestation.

Stomatitis (Sore Mouth).

Stomatitis is an inflammation of the mouth. There are so many different forms of this trouble that space will not allow the description of each one separately, but the catarrhal type, or simple redness of the mouth, is the one most frequently seen. If the case is neglected or improperly treated, the tissues will undergo changes that may develop into a most serious condition.

Inflammation of the mouth may occur after injury, by the sharp parts of plants, or of the bearded grains of barley, or the awns of various grasses. Chemical irritants may likewise cause it, particularly such as are applied externally as medicines. Occasionally sheep may drink solutions containing disinfectants and considerable inflammation will result.

The milk of animals suffering from certain diseases may produce inflammation of the mouth of the young lamb. Poisons contained in certain plants as mustard and hemlock, and occasionally fresh clover and insufficiently dried hay, may cause it. It is also claimed that feed infected with various fungi is particularly prone to cause inflammation.

The mouth will be hot, red, sensitive, with the result that the animal will chew its food in a careful and deliberate manner. The thirst is increased. On examination the membrane of the mouth may in addition to being inflamed, show small yellowish-gray ulcers, which generally cast off shreds of false membrane. Occasionally these ulcers extend over the lips and nose. The tongue may swell considerably, and the saliva will dribble from the mouth. As a result of the difficulty in taking feed, the animal soon loses flesh and there is a well marked unthrifty appearance. In young lambs the disease is often rapid and fatal, but older animals usually recover.

In most cases, a regulation of diet and the removal of the causative factors are all that is required to bring about a speedy recovery. The diseased sheep should be fed on green feed, fine hay and if necessary, bran or gruel. Affected animals should be

separated from healthy ones. Allow plenty of fresh water, as it enables the animal to rinse the mouth of the accumulations of material. The mouth should be swabbed out twice a day with a potassium chlorate solution of 1% to 3%, or alum ½% to 2%, or a hydrogen peroxide solution of 3%. A fountain syringe may be used to rinse out the mouth or a piece of rubber tubing, attached to a metal syringe, will answer the same purpose. Beneficial results may also be obtained by dissolving 2 tablespoonfuls of boracic acid in each pail of drinking water.

Some serious forms of scabby mouth are due to a virus infection. An autogenous vaccine made in a veterinary laboratory aids in immunizing the remainder of the flock.

Indigestion, Bloat.

Indigestion in sheep frequently takes the form known as bloat, which consists of the fermentation of food and the consequent formation of gas in the first stomach or rumen. It is generally due to sudden change of feed, and is most often seen when hungry sheep are turned into clover, rape or alfalfa, or allowed to have access to frozen turnip tops, frozen roots or an overdose of grain. Under such circumstances it not infrequently affects a considerable number of animals at once. A reliable remedy for this condition is to give affected sheep six ounces of raw linseed oil, to which has been added one-half an ounce (one tablespoonful) of turpentine.

If the distension with gas is extreme, the paunch may be tapped with a trocar and canula. This is done on the left side at a point midway between the point of the hip and the last rib, and a similar distance from the transverse process of the backbone, which may be felt towards the upper part of the paunch. It is necessary, especially in fat animals, to be careful in locating the seat of operation, as otherwise serious injury may result to one or other of the internal organs. The wool should be carefully parted so as to avoid the carrying of strands into the wound to cause subsequent irritation and suppuration. Every sheep owner should keep a trocar and canula where it can be found at a moment's notice. Where the proper instrument is not available it may, in an emergency, be better to risk puncturing into the paunch with a pocket knife, rather than let the animal die unrelieved, but the practice cannot be recommended, inasmuch as when the paunch begins to collapse, some of its contents are almost certain to escape into the abdominal cavity unless the opening is protected by the canula.

Constipation.

This condition occasionally occurs in sheep, especially when kept on coarse, dry feed. Lack of water and insufficient exercise may also

be a cause of the trouble. The usual symptoms are loss of appetite. The sheep does not chew its cud, tends to lie down most of the time, doesn't drink, may also show restlessness and have colicky pains. To relieve the condition, give six to eight ounces of raw linseed oil, together with two to four teaspoonfuls of turpentine. See that the patient is allowed plenty of water. Mineral mixtures containing salt should be available. The tendency to constipation is best combated by feeding a diet that is more laxative by including bran and linseed meal in the ration.

Diarrhoea.

Rather than a disease itself diarrhoea is usually a symptom of some other condition, which has produced an irritation of the stomach or intestinal canal. It may be the result of bad management or overfeeding with succulent food, or an indigestible diet, such as spoiled or frozen feeds, mouldy grains, poisons, intestinal parasites or some infections may also be the cause.

If there are severe cases in one flock it is always well to look to the diet for the cause. Separate sick animals from the rest of the flock. It may be advisable to put the well sheep on a new pasture. Affected sheep may be given a laxative of four ounces of castor oil. Should the diarrhoea persist after this treatment, the sheep should be given some flour gruel combined with whites of eggs and a little stimulant, should the need of the latter be indicated. Should the diarrhoea be due to intestinal parasites, it will be necessary to treat the sheep for such worms. In any case of diarrhoea, endeavor to locate the cause and have it removed if possible.

Pneumonia.

The more common causes of bronchitis and pneumonia are: exposure to wet, cold weather, shearing and dipping during cold weather, and inhalation of gases and dust. It is more frequently seen in lambs than in adults.

The sheep has a listless, dejected appearance; appetite is affected; temperature is elevated. There may be a painful cough and discharge from the nostrils.

Separate affected animals. Provide comfortable, well ventilated quarters and supply appetizing food. If the wool has been clipped off, apply a mustard plaster to both sides of the chest. Good care and nursing are very essential. Consult your veterinarian regarding the use of the sulfa drugs in treating pneumonia.

POISONS

It is generally considered that the losses due to poison fall into one of the following three classes: mineral, vegetable and animal.

Mineral Poisoning.

It occasionally happens that alkali poisoning causes considerable loss in a flock of sheep. Upon investigation it is generally found that the animals had access to some slough that contained a heavy percentage of these alkaline salts. The animals become hot and thirsty, and drink large quantities of the water. The symptoms are colicky pains, enteritis, some frothing at the mouth and nose, followed by bloody diarrhoea, collapse and death. The administration of large quantities of vinegar, raw eggs, gruel and oily preparation may aid in bringing about recovery. Frequently the effects are too advanced for a satisfactory recovery.

Sheep Dip Poisoning.

Occasionally animals may become poisoned in this manner by swallowing some of the solution or having it pass into the respiratory organs. In these cases treatment is most unsatisfactory, and as a rule death soon takes place. The administration of stimulants such as aromatic spirits of ammonia or sweet spirits of nitre, may give some relief, but usually the animal dies before these have a chance to produce any effect.

Vegetable Poisoning.

Under this heading comes poisonous plants, such as death camas, loco, larkspur and water hemlock. Space will not permit discussing this subject to any extent, but the bulletin "Weeds Poisonous to Livestock," prepared and distributed by the Provincial Department of Agriculture, and obtainable upon applications, covers this subject most fully. The treatment for all plant poisonings is to administer large quantities of stimulants such as sweet spirits of nitre, or whiskey, along with a mixture of potassium permanganate and aluminum sulphate, in 10 grain doses of each. Tannic acid is also a well known antidote for many vegetable poisons.

Under poisons of this class there is one that should receive particular attention. That is silage, or ensilage poisoning. Numerous cases have been reported in the past, and there is no question that if the ensilage becomes mouldy it becomes one of the most dangerous poisons for sheep. The symptoms develop rapidly, and include violent colic, intense inflammation of the digestive tract, diarrhoea, convulsions and death. Treatment is usually unsatisfactory, and in spite of the antidotes recommended above, very

little can be done. Gruels and warm, sweet milk, containing beaten raw eggs, are soothing and nourishing and are worthy of a trial at least.

Animal Poisons.

Under this heading would come poisons, the result of snake bites and insect stings of various kinds. The former is seen occasionally in Southern Alberta, and is likely to produce a serious local irritation, and occasional constitutional disturbances. The symptoms of snake bite is a swelling, producing intense local inflammation, accompanied by depression, weakness, feeble pulse, difficult breathing, stupor or convulsions. In the way of treatment, the bitten part should be incised and bleeding encouraged. Potassium permanganate in a 5% solution may be applied into and around the wound. Stimulants, such as alcohol, coffee and aromatic spirits of ammonia, should be administered, as there is usually a well marked depression.

Bites from insects such as wasps and bees at times set up severe local irritation. To produce serious general effects, the poisons would have to be introduced into the victim in large quantities, as when an animal is stung by a swarm of bees or wasps. The proper treatment would be to wash the parts with ammonia solution or permanganate of potassium, well diluted, and to give some of the common internal stimulants.

GESTATION TABLE FOR SHEEP

(Based on 146-day period)

The average for 707 gestation periods was between 146 and 147 days

MONTH BRED

Day of Month Bred	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	DATES DUE											
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	27	27	25	25	24	25	24	25	25	24	27	26
2	28	28	26	26	25	26	25	26	26	25	28	27
3	29	29	27	27	26	27	26	27	27	26	29	28
4	30	30	28	28	27	28	27	28	28	27	30	29
		July										
5	31	1	29	29	28	29	28	29	29	28	31	30
	June									Mar.	Apr.	May
6	1	2	30	30	29	30	29	30	30	1	1	1
7	2	3	31	31	30	31	30	31	31	2	2	2
			Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.			
8	3	4	1	1	1	1	1	1	1	3	3	3
9	4	5	2	2	2	2	2	2	2	4	4	4
10	5	6	3	3	3	3	3	3	3	5	5	5
11	6	7	4	4	4	4	4	4	4	4	4	4
12	7	8	5	5	5	5	5	5	5	7	7	7
13	8	9	6	6	6	6	6	6	6	8	8	8
14	9	10	7	7	7	7	7	7	7	9	9	9
*15	10	11	8	8	8	8	8	8	8	10	*10	10
16	11	12	9	9	9	9	9	9	9	11	11	11
17	12	13	10	10	10	10	10	10	10	12	12	12
18	13	14	11	11	11	11	11	11	11	13	13	13
19	14	15	12	12	12	12	12	12	12	14	14	14
20	15	16	13	13	13	13	13	13	13	15	15	15
21	16	17	14	14	14	14	14	14	14	16	16	16
22	17	18	15	15	15	15	15	15	15	17	17	17
23	18	19	16	16	16	16	16	16	16	18	18	18
24	19	20	17	17	17	17	17	17	17	19	19	19
*25	20	21	18	18	18	18	18	18	18	20	*20	20
26	21	22	19	19	19	19	19	19	19	21	21	21
27	22	23	20	20	20	20	20	20	20	22	22	22
28	23	24	21	21	21	21	21	21	21	23	23	23
29	24	....	22	22	22	22	22	22	22	24	24	24
30	25	....	23	23	23	23	23	23	23	25	25	25
31	26	....	24	....	24	....	24	24	....	26	....	26

Example: If a ewe was bred on Nov. 15th the date she will be due to lamb may be found by glancing at the figure 15 on the left hand column, headed "Day of month bred," and then following across to the right on this line until the column headed November is reached. The day and month of lambing will be found in this column. For specific example note the months and figures marked (*). Ewe bred Nov. 15th, due to lamb April 10th.